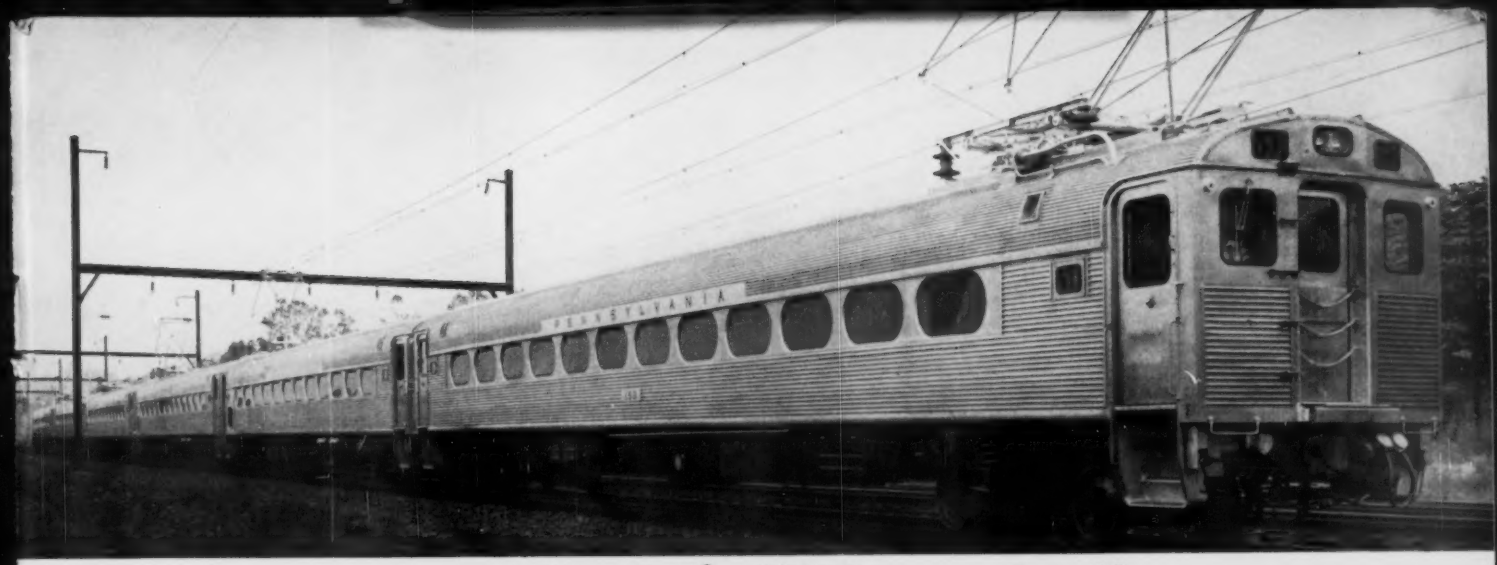


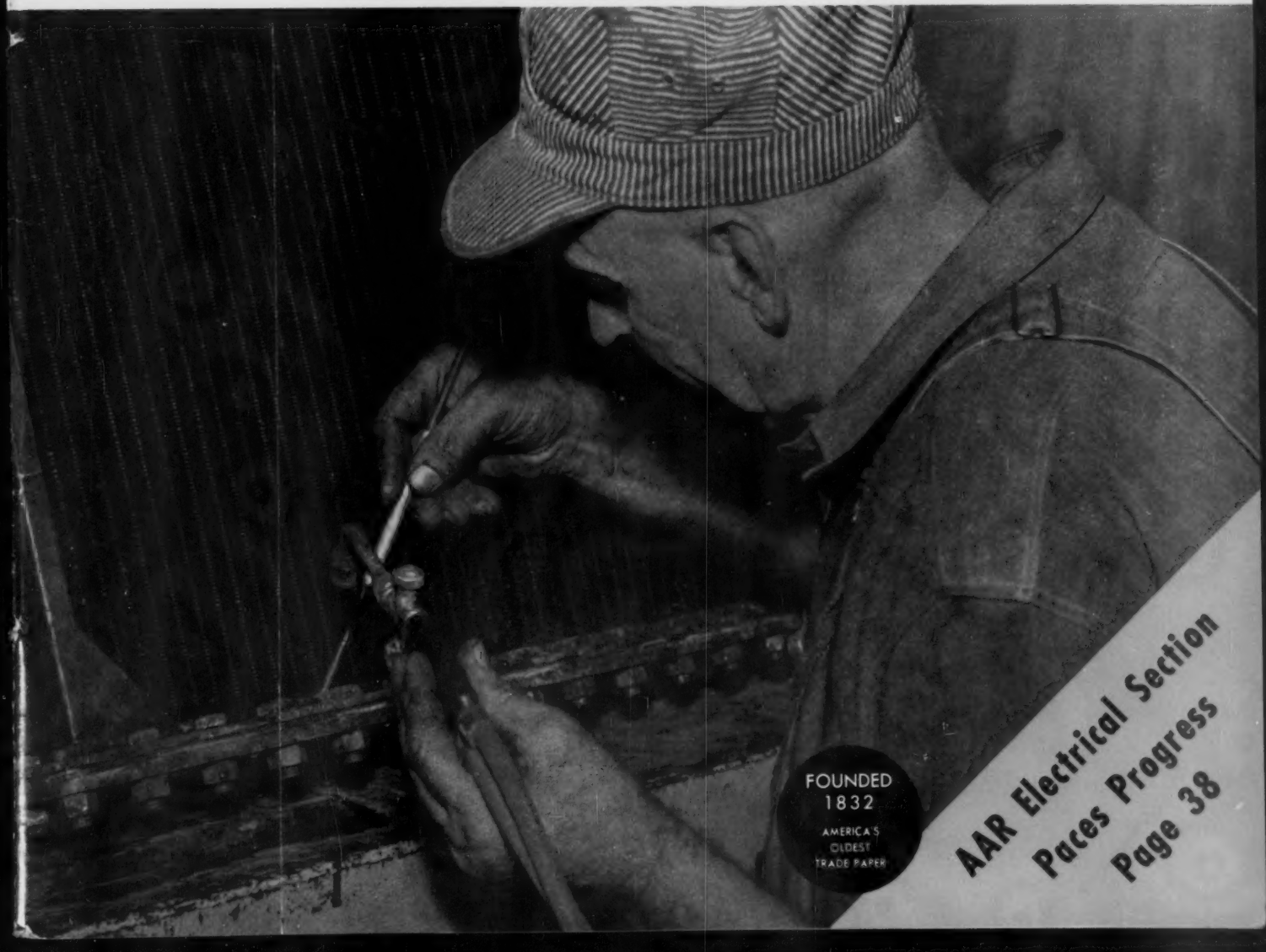
Pennsy Ignitron-Rectifier M-U Cars . . . . . Page 21

RAILWAY

LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN **TIME-SAVER** PUBLICATION **AUGUST 1958**

Frisco Overhauls Diesel Radiators . . . . . Page 24



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AAR Electrical Section Paces Progress Page 38

MINER DRAFT GEARS

contribute greatly to railway operation economies as they guard lading from damage and serve with maximum efficiency for an extremely long period of time.

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The Oldest Trade Paper
In the United States

AUGUST 1958—VOL. 132 NO. 8

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REPORT FOR AUGUST

Special Committee Works on Red Book Rules

The AAR advises that the permanent liason committee appointed to handle interpretation of Red Book rules with the ICC is now functioning. Agreement as to the intent of certain rules has been reached and some informal discussions have been had with the ICC.

Under the new law, the present AAR Rules for Inspection Testing and Maintenance of Air Brake Equipment on Locomotives and Cars, as revised in 1957, will become the Rules of the Interstate Commerce Commission. Since there may be other rules in need of clarification, the AAR considers it advisable to get such questions clarified if possible, prior to August 9, 1958, the effective date of the ICC order. Future questions pertaining to interpretation or clarification are to be reported to the Mechanical Division office for handling by the Special Committee.

Santa Fe Unveils "Shock Control" Freight Car

The Santa Fe has unveiled its first new "Shock Control" freight car, ATSF 10001—a modified DF box car with a floating underframe—an order for 100 of which was reported on page 5 of the July issue. The car is also equipped with roller-bearing ride-control trucks with long travel springs and 6x11 journals to compensate for additional weight and to provide 60-ton capacity instead of the 50-ton capacity usually specified for a car of this size.

The "Shock Control" design incorporates into the car a movable center sill with a predetermined amount of travel in either direction. A hydraulic device located horizontally in the middle of the car retards the sill travel. The gear absorbs impact energy from both buff and draft impacts without inherent recoil, according to the Santa Fe. Sill travel covers 10 in. in either direction.

Use of the "Shock Control" system with conventional high-capacity draft gear, the Santa Fe indicated, will protect fragile lading at impact speeds of up to approximately 12 mph.

The cars are scheduled for construction during August and September at the company's Topeka, Kan., shops.

AAR Roller Bearing Inspection Requirements

The AAR has recently issued information to all members on inspection of roller bearings on freight cars in interchange service. It covers bearings currently being supplied according to the "Specifications for Approved Journal Roller Bearings Applicable to Interchange Freight Cars" included in the Manual starting on Page D-39-1957.

Roller bearings of this type are easily identified because they have exterior end caps which rotate when the car is in motion. These roller bearings of all manufacturers are interchangeable in all types of side frame adaptors. The bearing outer race is the housing for the bearing assembly and the whole assembly is interchangeable in the various types of side frames using suitable frame adaptors to transmit the load from frame to bearing. Since many maintenance and inspection personnel are not familiar with these applications, the information is provided until similar materials is available in AAR publications.

Inspections should include the following:

1. *Check the operating temperature.*—Running temperatures of 15 to 50 deg above at-

(Continued on page 8)

TIME SAVING IDEAS FOR AUGUST

MOTIVE POWER AND CAR

Budd Pioneers Go Into Pennsy M-U Service 21
Here's How the Frisco Overhauls Radiators 24
How Great Northern Applies Cement Flooring 26
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ELECTRICAL

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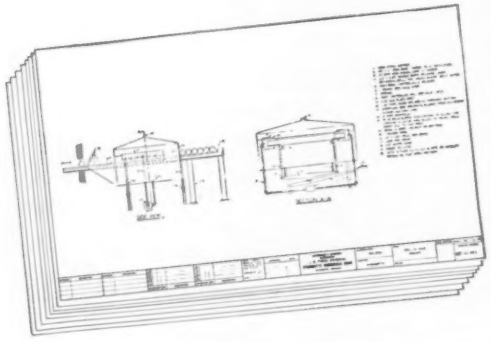
Pennsylvania Railroad cleans ax

Photo shows axle in rinse position. The spray hood has a capacity of 8 to 10 axles, depending on size.



Here are five typical Wyandotte blueprints that can help cut your cleaning costs. Consult your Wyandotte cleaning specialist for others.

1. **Diesel Engine Block Cleaning Tank**
2. **Diesel Engine Block Washer**
3. **Diesel Engine Spray Cleaning Setup**
4. **Diesel Truck Spray Washer**
5. **Spray Cleaner for Box and Hopper Cars**

s axles at 1/3 the labor cost

Wyandotte blueprint cuts costs by letting one man do the work of three

The Pennsylvania Railroad, well-known for its good housekeeping program, has done it again! Their shops at Pitcairn, Pa., used to clean journals of unmounted axles with steam and petroleum spirits, wiping them dry with rags. Production rate was 30 to 35 axles per eight operator hours.

But not any more! Using a Wyandotte blueprint, they installed a Roll-In Axle Washer that requires only one operator, and the production rate is now 90 to 100 axles per eight operator hours.

Equipment shop-built

What's more, the equipment was completely shop-built, mostly from scrap. Here's how it works:

The operator feeds unmounted axles under the spray hood by means of a transfer mechanism. Axles are then sprayed with hot Wyandotte 11 solution, forced by a motor-driven centrifugal pump. Axles roll out by gravity to the rinse position, one at a time. As one axle rolls out, another is transferred into the tank by the operator.

Many blueprints available

Many railroads have profited by using Wyandotte blueprints to install time-saving, money-saving cleaning processes. You can too! The list at the left shows some of the blueprints Wyandotte makes available to railroads—and there are many more.

But these blueprints are only a part of our systemwide service. Your Wyandotte cleaning specialist, assigned permanently to your line, can improve your cleaning in any local area or on a systemwide basis. If you are not taking full advantage of this service, get in touch with *your* Wyandotte cleaning specialist, or mail coupon today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

J. B. FORD DIVISION

COMPLETE LINE OF CLEANERS FOR ALL RAILWAY NEEDS

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Department 3095
Wyandotte, Michigan

☐ Please rush free blueprint for the following cleaning process:

_____

☐ Please have a Wyandotte cleaning specialist call on me.

Name _____

Railroad _____

Department _____

Address _____

City _____ Zone _____ State _____

REPORT FOR AUGUST—*Continued from page 5*

mosphere may be expected in normal operation and can be checked by placing the bare hand against the frame adaptor. An overheated bearing would be one on which the hand could not be held for a few seconds. The end cap temperature may be considerably higher than the bearing temperature during the initial run-in period of synthetic rubbing type enclosure seals, and should not be used as a point to check temperature.

If an overheated bearing is found, only

(*Continued on page 14*)

Coordinated Mechanical Associations Meeting September 15-17, Chicago

R. L. Dearmont, president, Missouri Pacific, will be the principal speaker at the luncheon of the Coordinated Mechanical Associations at noon on Tuesday, September 16, at the Hotel Sherman, Chicago. The luncheon honors all railroad presidents. Entertainment has also been arranged by the Allied Railway Supply Association for its membership during the time of the meetings, the tentative programs for which follow.

Locomotive Maintenance Officers'

MONDAY, SEPTEMBER 15

10 am

Address: Pres. F. R. Denney.

Address: T. T. Blickle, general manager-mechanical Atchison, Topeka & Santa Fe.

Report: Diesel Mechanical—Other than Engine.

2 pm

Report: General Diesel Maintenance Subjects.

Report: Shop Equipment.

TUESDAY, SEPTEMBER 16

9 am

Address: C. W. Taylor, director, Bureau of Safety and Service, ICC. Subject: Certain Functions of the Bureau of Safety and Service Affecting Locomotive Maintenance.

Report: Diesel Electrical.

2:30 pm

Visit to AAR Research Laboratory.

Visit to EMD.

WEDNESDAY, SEPTEMBER 17

9 am

Report: Diesel Engine Maintenance.

Report: Diesel Material Reclamation.

2 pm

Report: Steam Generator Maintenance and Water Treatment.

Report: Fuel and Lube Oil.

Railway Fuel and Operating Officers

MONDAY, SEPTEMBER 15

10 am

Address: Pres. O. D. Teeter.

Report of secretary.

Address: R. Knox Bradford, vice-president-traffic, D&RGW.

Safety, E. L. Duggan, system superintendent safety, AT&SF.

Employee Responsibility in Promoting Public Relations, Douglass Campbell, vice-president, NYC.

Progress of Oil-Burning Gas-Turbine Electric Locomotive.

2 pm

Joint meeting with Air Brake Assn.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Panel discussion—Train Handling.

Budd Frate Brake—R. G. Stacy, Budd Co.

TUESDAY, SEPTEMBER 16

9 am

Radiation Studies of Fuels, Ray McBrian, director research, D&RGW.

Freight Loss and Damage Prevention. What it means to the railroads and the shipper.

Railroad Retirement—Social Security.

Panel discussion—Training Operating Personnel on Rule Compliance.

2:15 pm

Progress in Treatment of Fuel Oil.

Impending Legislation and Competitive Transportation Affecting Future of the Railroads, L. W. Horning, vice-president, NYC.

Panel discussion—Economical Utilization of Power.

Treating of Rails Chemically, G. W. Luvisi, manager products development, National Aluminate Corp.

WEDNESDAY, SEPTEMBER 17

9:30 am

Planned Supervision—Personnel Selection and Training.

Panel discussion—Diesel Troubles.

2 pm

Official business.

Duties and Responsibilities of an Operating Officer.

Air Brake

MONDAY, SEPTEMBER 15

10 am

Address: Pres. C. C. Maynard.

Address: A. Campbell, president, International Equipment Co.

Present Repair Track Maintenance Procedures—Montreal Air Brake Club.

Modern Air-Brake Shop Facilities, R. J. Dewsbury.

Limitations of Pneumatic Air-Brake Control, H. N. Sudduth, New York Air Brake Co.

2 pm

Joint meeting with RF&OOA.

Address: R. M. MacDonald, director of operation, Board of Transport Commissioners for Canada.

Budd Frate Brake—R. G. Stacy, Budd Co.

TUESDAY, SEPTEMBER 16

9 am

Basic Operating Characteristics Passenger Car Brake Equipment, St. Louis Air Brake Club.

Effects on Air-Brake Equipment of External Heat Applied to Railroad Equipment for Thawing Frozen Commodities—Central Air Brake Club.

The Composition Shoe Contribution to Modern Railroad Service, P. O. Willaman, Westinghouse Air Brake Co.

Trends in Air-Brake Shop Facilities—Manhattan Air Brake Club.

2 pm

EMD tour.

WEDNESDAY, SEPTEMBER 17

9 am

Elections.

Malfunctions and Remedies of Air Brake Equipment—Pittsburgh Air Brake Club.

Question Box.

Committee reports.

Car Department Officers'

MONDAY, SEPTEMBER 15

10 am

Address: Pres. H. L. Hewing.

Report: Committee on Construction, Maintenance and Upgrading Freight-Car Equipment.

Address: Speaker to be named.

2 pm

Report: Committee on AAR Loading Rules.

Report: Committee on Interchange and Billing for Car Repairs.

Report: Committee on Wheel-Shop Practices.

TUESAY, SEPTEMBER 16

9 am

Report: Committee on Light Repair Tracks and Train-Yard Operation.

Address: L. L. Adams, assistant to vice-president, traffic, United States Steel Corp.

Report: Committee on Maintenance of Passenger Car Equipment.

2 pm

Report, Committee on Car Lubrication.

Comments: W. M. Keller, vice-president (research), AAR.

WEDNESDAY, SEPTEMBER 17

9 am

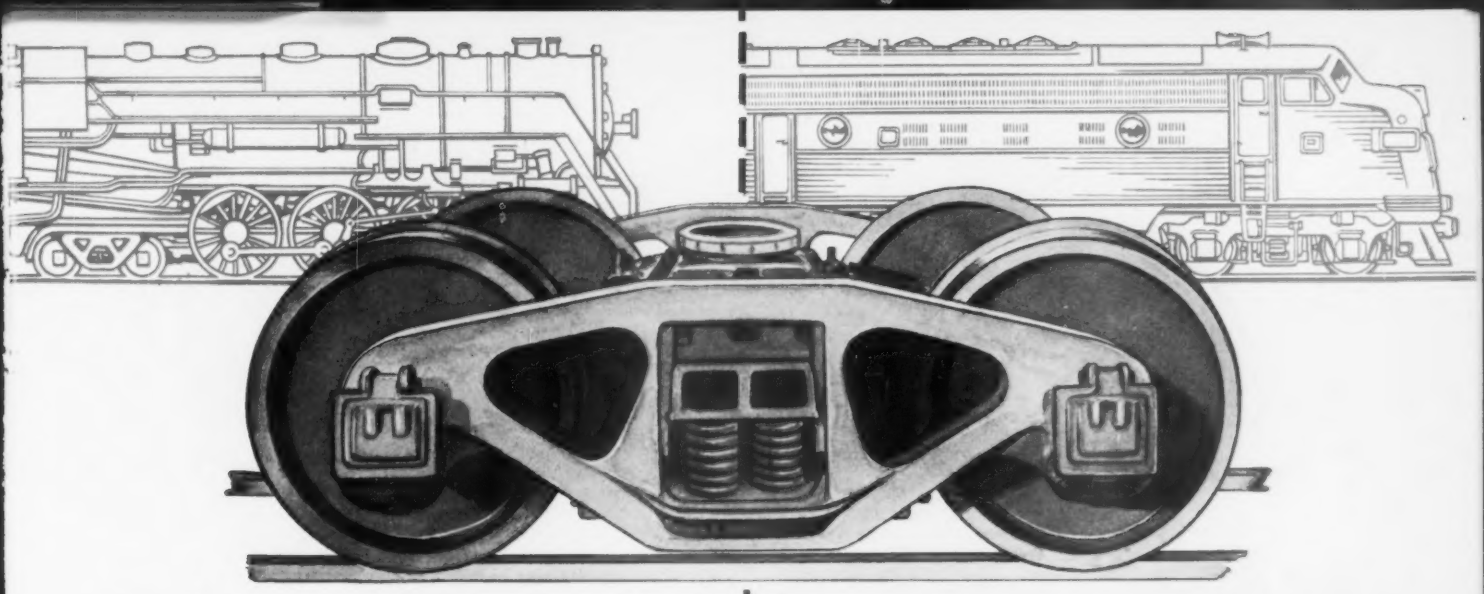
Report: Committee on Air-Conditioning Equipment, Operation, and Maintenance.

Report: Committee on Maintenance and Servicing of Mechanically Equipped Refrigerator Cars.

Report: Committee on Painting—Modern Methods in Finishing Railroad Equipment.

Miscellaneous reports.

Election of officers.



The Old and the New...

A Great Step Forward!

With waste gradually being discontinued in journal lubrication, the change-over to a better type of lubricator raises certain questions: what type should it be; what qualities should it possess; what kind of a performance should be expected of it? To help you decide, consider what the JBS Acme Lubricator offers and compare it with any other lubricator. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

JBS
ACME JOURNAL LUBRICATORS

- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

GUARANTEED Quality, Workmanship and Material as represented

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*Patent applied for

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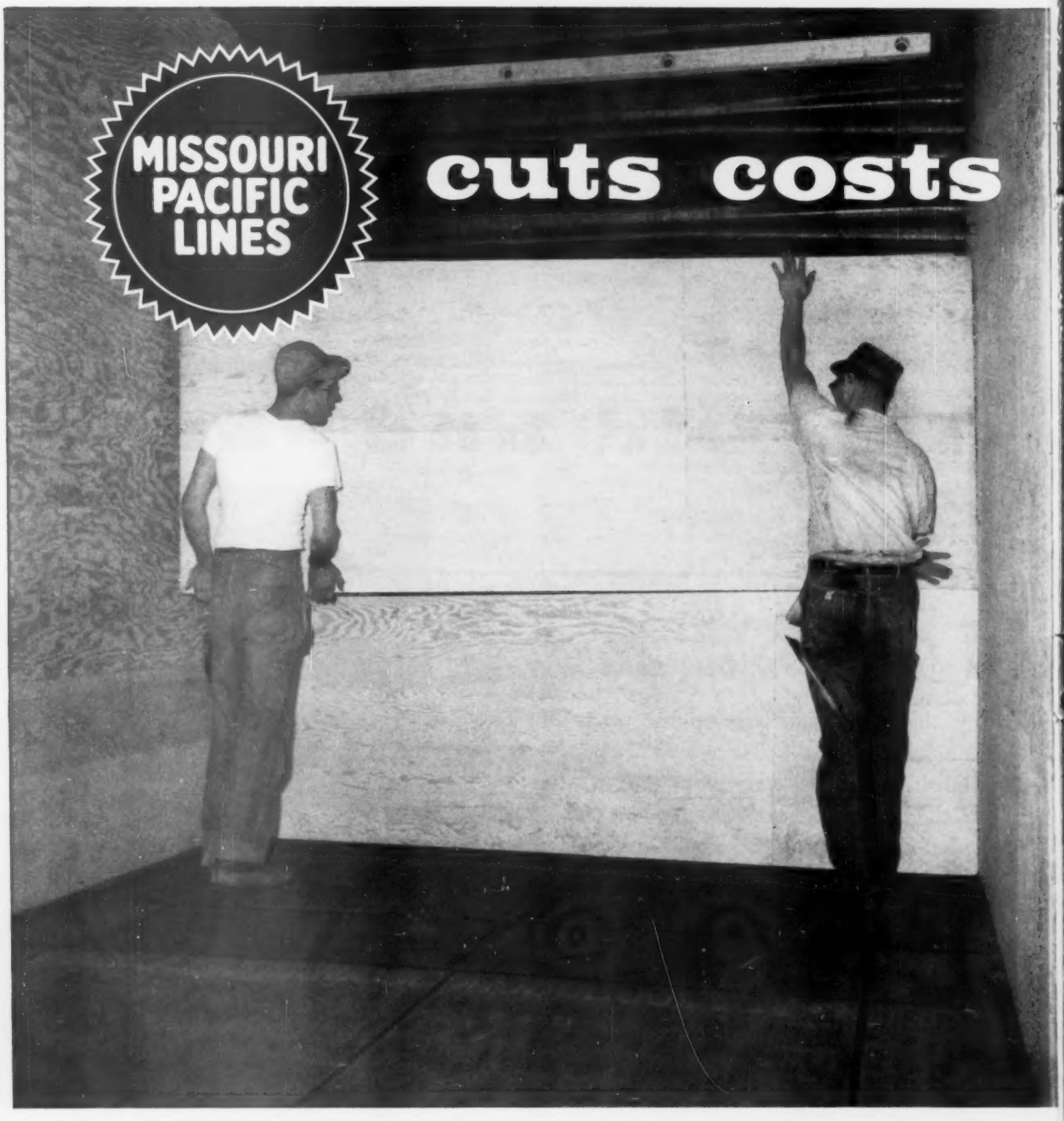
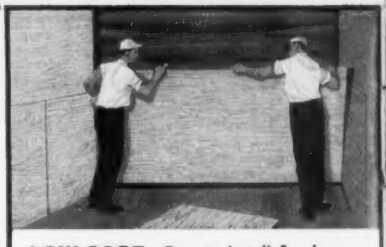


Only Exterior Fir Plywood car lining has all these advantages:



LOW COST—Easy to install fir plywood lining speeds work . . . saves 50 per cent and more in labor costs alone.

with Fir Plywood boxcar lining

Missouri-Pacific reports Exterior plywood speeds work, saves 10 man hours per car

EXTERIOR FIR PLYWOOD car lining plays an important role in the big, fast-moving operation at Missouri-Pacific's construction yard at DeSoto, Missouri, where modern assembly line techniques can send a new boxcar into service every hour of the day.

The in-place cost of the plywood car lining is less than T & G lumber, chiefly because it can be installed so much faster. Shop officials estimate that fir plywood saves over 10 man hours per 40-foot car. Total lining costs (including labor and materials) comes to less than $220 per car.

For Mo-Pac fir plywood has demonstrated its superiority in other ways, too. Interior surfaces are smooth, and the danger of infestation is minimized. Shippers like it because it's a clean (and easy-to-clean) lining that protects valuable ladings. Waterproof Exterior plywood is a strong, tough, rugged material capable of shrugging off blows that would split ordinary lumber.

Over the long haul, too, fir plywood lining pulls its freight with lower maintenance and longer life.

At their DeSoto shops, Mo-Pac does big things in a big way, *fast*. Specially developed high-speed assembly line technique sends 8 new boxcars into service every day.

Exterior plywood is nailed horizontally with ¾" fir plywood for side walls and 1" fir plywood for end walls. Crews use cement-coated nails with a special spiral thread for better holding power.

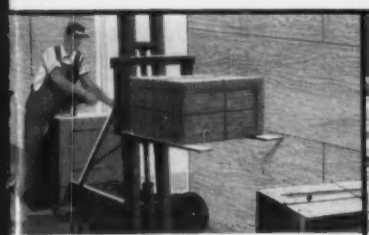
FOR MORE INFORMATION about fir plywood—its uses, properties and advantages—write

DOUGLAS FIR PLYWOOD ASSOCIATION
TACOMA 2, WASHINGTON

—an industry-wide organization devoted to research, promotion and quality control

Always specify by DFPA grade-trademarks

DFPA TESTED QUALITY

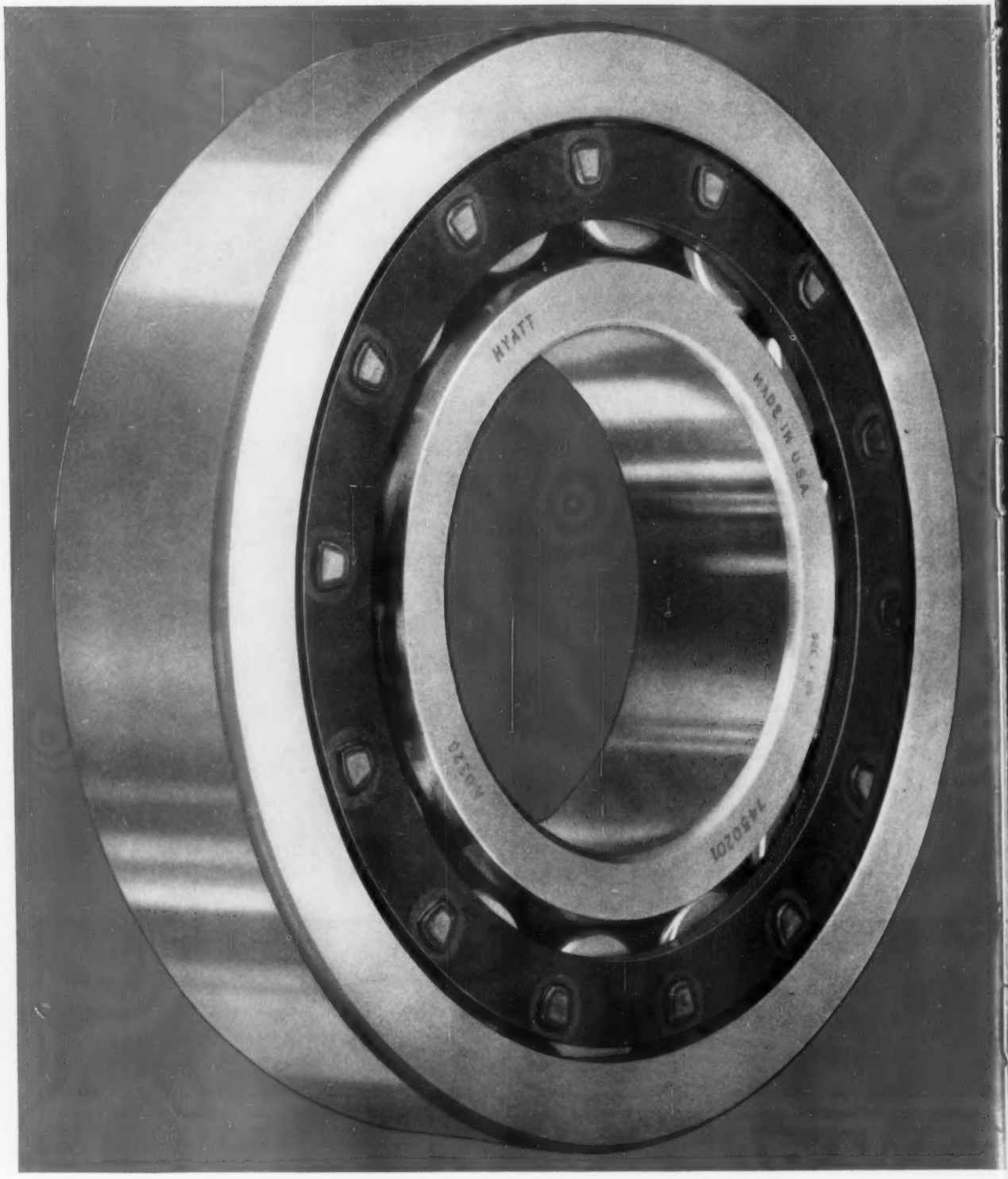


STRONG—Plywood has tremendous impact resistance . . . shrugs off blows that would split ordinary lumber.

SMOOTH—Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.

WATERPROOF—Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

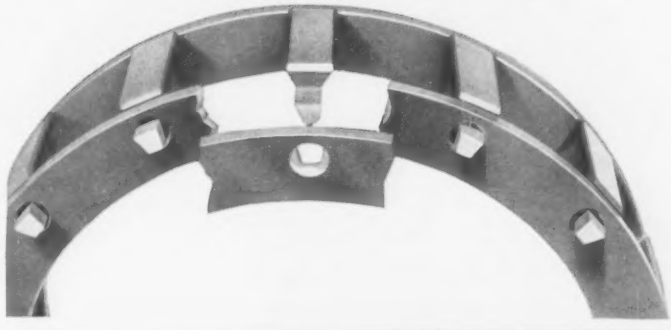
New Pinion End Bearing



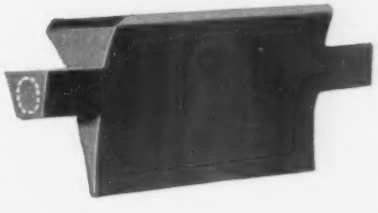
Extends Service Life !

*Traction motor performance improved through new type trapezoidal trunnion cage design**

Longer lasting. Secret of this new pinion end traction motor bearing lies in the unique construction of the steel roller cage. A roller riding cage bearing normally has an exceptionally long service life, but with the development of the trapezoidal trunnion cage, this bearing has an even longer life potential.



Twice the strength. Trapezoidal shape of the cage bar trunnion has 60% more metal than previous cylindrical trunnions. The trapezoidal trunnion fits to a conforming hole in the cage ring to form a rigid, twist-proof cage that is at least twice as strong as any previous cage design.



Immediate delivery. The new trapezoidal trunnion bearing is available for immediate delivery from Electro-Motive's nine convenient on-line warehouses:

Los Angeles, Calif.
Emeryville, Calif.
North Salt Lake, Utah
Fort Worth, Texas
Minneapolis, Minn.
Halethorpe, Md.
Jacksonville, Fla.
Robertson, Mo.
La Grange, Illinois (factory and parts center)

For remanufactured bearings, too. Save 25% over completely new bearings by having your worn-out flange-riding and roller-riding cage bearings brought up to brand-new standards through EMD factory remanufacturing service. With the new trapezoidal trunnion cage, these bearings will last much longer. Ask your Electro-Motive representative for complete details.

* Produced by Hyatt Division, General Motors.

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GENERAL MOTORS LOCOMOTIVES

REPORT FOR AUGUST—*Continued from page 8*

AAR approved roller bearing grease should be applied unless the bearing has obviously been destroyed by overheating. In this case, friction bearing hot box coolant or "dope", or other available lubricant can be used to move car to a suitable set-off point.

2. *Visually inspect for damaged or missing parts.*—Observe the external appearance as compared to other assemblies on the cars.

3. *Visually inspect for proper seating of the frame adaptor on the bearing.*—All frame adaptors have downward projecting thrust flanges which centrally locate the frame adaptor on the bearing. Due to misapplication, it is possible to have the frame adaptor mislocated so that one of the frame adaptor thrust flanges is resting on the outside diameter of the bearing. This type misapplication can occur when assembling a truck, in rerailing a derailed car or when moving a truck by an overhead crane attached to the bolster or side frame instead of the wheels and axles.

Illustrations show the improper and proper seating of the wide frame adaptor which is used with the wide pedestal frame. A similar condition could occur on some other types of side frames having wide pedestal frame openings such as the Vulcan side frame. A narrow adaptor is used in both the narrow pedestal and integral box type side frames to adapt the same roller bearings to these frames as is used in the wide pedestal frames. The integral box frames could become misaligned on the roller bearings similar to the wide pedestal frames. It is necessary to look into the integral box to see if the frame adaptor is in its proper position.

Narrow pedestal frames are designed so that the narrow adaptor cannot be disengaged from the bearing under ordinary circumstances. Wrecks or derailments which might damage the retainer key in the pedestal leg of the frame could permit disengagement of the bearing and the frame adaptor.

The AAR requests these inspection requirements should be made available to all concerned who handle such equipment.

Repairs to Damaged Cars

The Arbitration Committee, on June 23, 1958, completed its investigation of Case 1855 involving the Illinois Central and the Consolidated Chemical Industries with regard to charges for damages in derailment of CCIX cars 1172 and 1200 on the Illinois Central. The derailment occurred on the IC on September 27, 1956, at Amite, La., and defect cards bearing notation "Home for Repairs" were issued authorizing bills for repairs to all unfair usage damage based on AAR rules and prices.

Consolidated Chemical Industries, the car owner, requested the cars to be forwarded to shops of Shippers' Car Line for repairs—CCIX 1172 to Smackover, Ark., and CCIX 1200 to Milton, Pa. This was done only after the Illinois Central advised Consolidated they could not make the repairs. After the cars were repaired, Shippers' Car Line submitted billing repair cards to Consolidated and billed them direct as follows: CCIX 1172, $3,521.64; CCIX 1200 $6,325.00—Total, $9,846.64

Consolidated, in turn, counterbilled the Illinois Central in these amounts. Audit of repair cards furnished the IC showed AAR allowances for repairs to be $2,305.73 for CCIX 1172 or a difference of $1,215.91; and $4,897.35 for CCIX 1200 a difference of $1,247.65, a total difference of $2,643.56 over and above the AAR allowances. Bills were returned to the car owner requesting the charges be reduced to the AAR allowances for repairs, at which time the bill for CCIX 1172 was reduced $765 because of error in preparation of Shippers' bills.

Consolidated Chemical Industries returned the corrected bills and insisted they be reimbursed by the IC in the amount of $9,081.64 ($9,846.64 minus $765.00). Under protest, Consolidated agreed to accept payment of $7,203.08, the maximum AAR allowance, and submit the matter to aribtration to collect the difference of $1,878.56. The IC having made payment on the basis of maximum permitted under the rules, joined in submitting the matter to Arbitration.

The Arbitration Committee, in its decision on June 23, sustained the contention of the Illinois Central. Subsequent investigation, concurred by both parties, showed the cars were traveling on mileage equalization. The AAR Interchange Rules, the committee said, provide the basis on which charges for repairs to damaged cars are to be made on authority of defect card.

Orders and Inquiries For New Equipment

Orders for 14 and 268 diesel-electric locomotives, respectively, have been placed since the closing of the July issue. The *Minneapolis & St. Louis* will purchase 14 1,750-hp GP-9 diesel-electric locomotives from Electro-Motive Division of General Motors at a cost of $2,640,000. Delivery will be made in October. The *Norfolk & Western* will purchase 268 general-purpose diesel road switchers and switchers at an estimated cost of $50 million. Some will be equipped for passenger service. Of some 262 steam locomotives now on the N&W, 202 will be retired by the end of 1960. The remaining 60 will be used as standby power.

The *Chicago, Burlington & Quincy* will build 100 40-ft 6-in. box cars with cushion underframes and damage-free loading devices. The road also will buy 100 covered hoppers from Pullman-Standard and 50 Air-Slide hoppers from General American Transportation Corp. Both types will have roller bearings. The *Chicago Great Western* ordered five 50-ton Thrall insulated box cars at an estimated cost of $14,000 each. *North American* has purchased 20 2,003-cu-ft and 15 2,893-cu-ft hopper cars from Pullman Standard. Approximate costs, $9,300 and $11,000 each, respectively. The *St. Louis Southwestern* expected to complete construction of 50 70-ton pulpwood cars at its Pine Bluff shops last month. Estimated cost, $570,800.

Letters to the Editor

Pete's Popularity

Our series on mechanical refrigerator car trouble-shooting has proved to be popular. Pete will solve his next problem in our September issue. In requesting suggestions about this series, we received the following comments.

TO THE EDITOR:

The article "Timed for Trouble" was of special interest to me. Articles of this type appearing regularly and presented in such a manner can do as much for the service man as a formal training school.

John S. O'Neil,
Service Manager, Transportation Equipment, Carrier Corporation

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These articles are prepared in a very interesting manner and certainly believe they will prove worthwhile and interesting to anyone in the railroad industry that may come in contact with mechanical refrigerator cars.

We think the series of articles should be continued, and, if we can furnish information at any time that will be helpful, we will be glad to do so.

G. P. Torburn,
General superintendent, Car Department Pacific Fruit Express Company

I have read these articles and think you have presented the subject in a unique and interesting way that would make them attractive to anyone concerned in this particular subject. The only adverse comment I could make would be that the text is perhaps longer than it would have to be to convey the same information, and it is entirely possible the reader would prefer to have it presented in a more concise form.

W. N. Messimer,
Manager-equipment, Merchants Despatch Transportation Corp.

I think the articles will prove very worthwhile.

R. G. Setzekorn,
Mechanical superintendent American Refrigerator Transit Company

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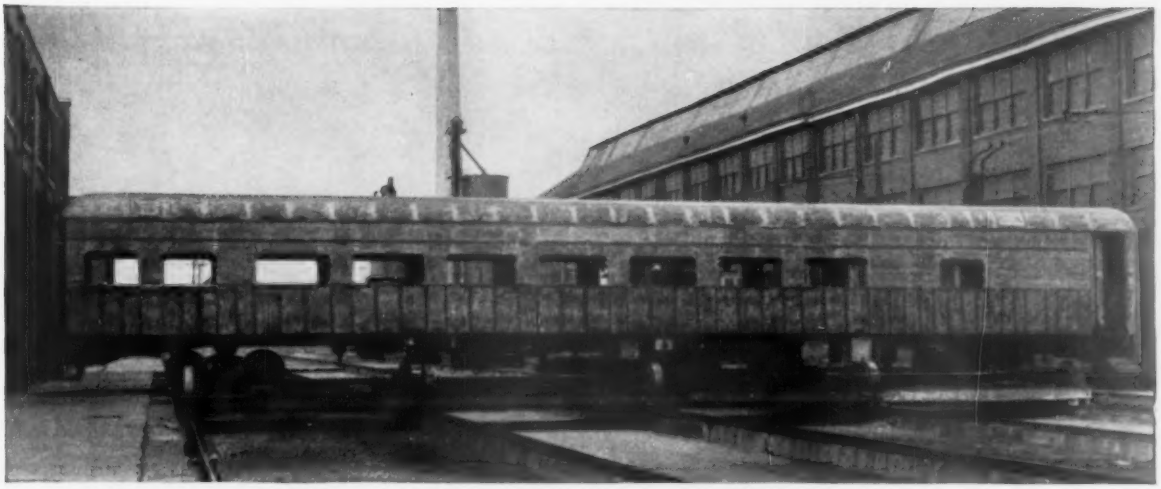
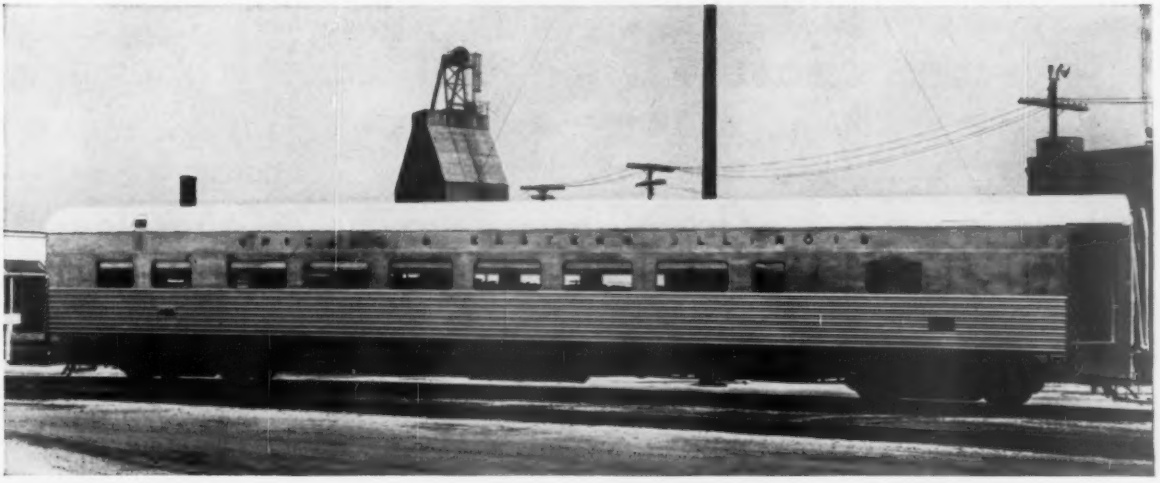
Everyone in our organization commented favorably on the way the articles were written. They are certainly true to form and should be of definite assistance to maintenance men as well as to those concerned with design and engineering of such equipment.

Paul W. Mantz,
Assistant sales manager, Railway Division, Waukesha Motor Company

(*Continued on page 62*)



At 1/8 of new-car cost, old cars are stripped...



"New-looked" with nickel-containing stainless steel

A low-cost "new look" with nickel-containing stainless steel has added many years of service to this and ten other passenger cars.

The 11 cars were rebuilt at the Chicago & Eastern Illinois Railroad shops for less than the cost of two new cars! That's why you'll want to consider such economical "face lifting" to give new life to your outmoded cars. Here's how C & EI did it:

The cars had painted steel sheathing (which required frequent repainting) above sills, fluted stainless steel siding below. First, they were stripped, inside and out. Next, undersurfaces were sandblasted, patched as necessary, given a protective coating. Last came the rebuilding. Smooth 20-gage 18-8 stainless steel was spot welded in place above sills, and the original fluted stainless, still in top condition, was reapplied below sills with Monel* nickel-copper alloy blind rivets.

Platforms, trap doors, and folding steps were rebuilt in nickel-containing stainless steel. New stainless sheathed door units and stainless wainscoting were installed.

There's good reason why nearly all new passenger cars are made of nickel-containing stainless steel. In structural members, for instance, its high strength-weight ratio enables designers to trim off deadweight. Its corrosion resistance, as in siding, has for many years cut maintenance costs. Car builders (and rebuilders) find that stainless steel's ductility and weldability permit fast, economical fabrication.

The booklet "Nickel Alloys in Railroad Equipment" describes how nickel-containing stainless and other nickel-containing alloys can lower costs, improve appearance and safety factors. Just write Inco for your copy.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO NICKEL

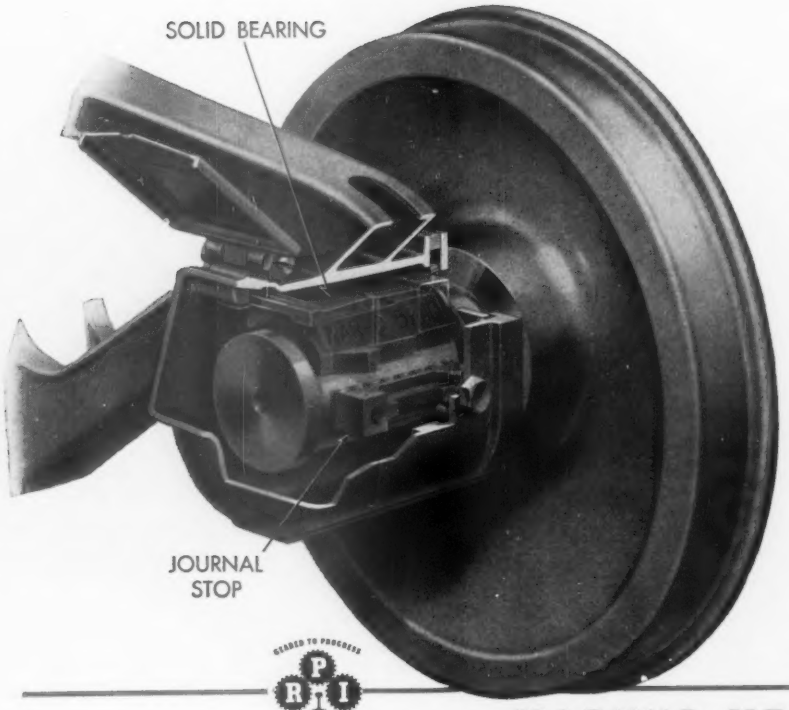
NICKEL MAKES ALLOYS PERFORM BETTER LONGER

HOW SOLID BEARINGS AND JOURNAL STOPS HELP KEEP

It's a fact...

that MAGNUS R-S JOURNAL STOPS can cut hot boxes 90%— save 43% on total bearing operating costs

Overall experience proves that Journal Stops performance you want—



AAR SOLID BEARINGS

Simple
Dependable
Economical
Safe

R-S JOURNAL STOPS

Permanent installation
Better bearing performance
Lower maintenance costs

MAGNUS METAL CORPORATION

RAILROADS OUT OF THE RED

This is how much you can save every year with Magnus R-S Journal Stops—almost $35 on every car so equipped!

can give you the kind of bearing and pay for themselves in less than 3 years

R-S Journal Stops stabilize the entire journal bearing assembly. That eliminates 90% of the hot boxes — probably even more. You cut down the service attention required. Conservatively you double bearing and dust guard life. You reduce wheel flange wear and get more miles per axle too.

Right now you save almost $35.00 per car annually — pay the complete cost of the Stops, including installation, in less than three years. And bigger savings are sure to come. That's because R-S Journal Stops will help make possible a further extension of intervals between repacks. (Without Journal Stops the maximum extension won't be practicable). They'll make it easier to provide an effective rear seal, save on oil, still more on servicing.

Yes, R-S Journal Stops are the low-cost answer to hot boxes. And with them you still have all the many advantages that solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight and get the lowest possible running resistance in pounds per ton. Best of all, with Journal Stops solid bearings can give the kind of performance you want at a price you can afford to pay.

Write us for *all* the facts . . . Magnus Metal Corporation, 111 Broadway, New York 6; or 80 East Jackson Boulevard, Chicago 4, Illinois.

MAGNUS

Solid Bearings

RIGHT FOR RAILROADS
. . . In performance . . . In cost

Subsidiary of **NATIONAL LEAD COMPANY**

Cutting Torch

The Arcair torch, a tool combining an electric arc and ordinary compressed air to melt metal and blast it out of the electrode path, is used for casting cleaning operations by Griffin Wheel. Equipment for the job consisted of a foundry model Arcair torch with ⅜-in. and ½-in. Copperclad electrodes, a Miller SR 400 Duplex rectifier type d-c welder and regular shop air at 95 psi.

Griffin has also employed Arcair in preparing used wheels for remelting. Because Arcair does not depend upon oxidation, the process works on those metals which do not oxidize readily, as well as on those that do. The Arcair process introduces less heat than any of the welding processes so that the physical properties of alloy steels, such as manganese, are unaffected. *Arcair Company, Dept. RLC, 447 S. Mt. Pleasant ave., Lancaster, Ohio.*

Journal Lubricator

The Armstrong lubricator is a specially woven wool-and-cotton pad attached to a light spring-steel frame. The pad is formed to fit the contour of the journal and is woven to insure only the points of the pile touch the journal surface. It is said to retain its shape throughout its entire life. Cotton wick feeders are woven into the pad so that after coming through the pad foundation they lie between the rows of the pile. The oil flow is metered and controlled by the type and number of wicks, which feed a continuous supply of oil to the pad. The wicking filters clean the oil so dirt and grit cannot reach the lubricating surface. One-third of the journal area, including the fillets, is always running in oil. According to the manufacturer, because there is no pumping action, no oil is lost through the rear of journal box.

Self-lubricating phenolic moulded buttons are imbedded in the pad surface and no amount of top pressure can impede oil circulation. These buttons, which cannot mark the journal, are said to prevent pad from glazing under any conditions. The springs hold the pad against the journal at correct pressure. They fit the bottom of journal box and cannot climb the sides.

The manufacturer claims that bearing temperatures remain fairly constant throughout temperature extremes. Also there is no displacement of the lubricator, linting or damage to pad in breakaway when frozen in sub-zero temperatures and no displacement of lubricator on impact. The Armstrong lubricator has been approved by the AAR for test applications. *Scullin Steel Company, Dept. RLC, St. Louis 10, Mo.*

Caboose Power Supply

This packaged power system for cabooses consists of a one-piece, 90-lb unit—alternator, regulator, and rectifier. They are pre-assembled and pre-wired at the factory, eliminating special mounting plates or brackets. The caboose battery and power supply are connected in parallel. The power supply is axle-driven and works through a Dayton endless Cog-Belt and drive system. The unit is normally mounted on the deck, inside the car.

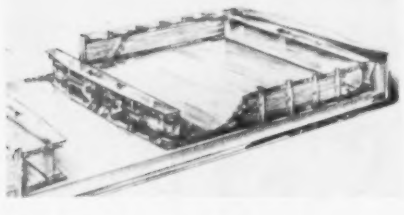
A 10 to 1 drive ratio with 36-in. wheels will permit charging to start at approximately 5½ mph. Full output is reached at 11 mph, and a steady 72 amp will be delivered from 11 to over 80 mph. *General Electric Company, Dept. RLC, Schenectady 5, N.Y.*

Transportation Insulation

Fiberglas Sealed-In Transportation Insulation is completely enclosed in polyethylene which protects against water soaking in refrigerated equipment normally cleaned by hosing. The polyethylene film is tough and will last indefinitely. According to the manufacturer, a recent inspection revealed nails had been driven through the polyethylene, but that water had not penetrated to the insulation.

The insulation is high in thermal efficiency. It was installed in a General American refrigerator car on December 1, 1955, and when removed and inspected on July 16, 1957, was in excellent condition, with the fresh, clean appearance of a new installation, with little evidence of slumping and/or water damage.

The insulation, which is odorless, is fabricated to fit the space. Its flexibility gives thermal tight butt joints and seals against the sides and around bracing arms, eliminating the need for cementing joints and seals. *Owens-Corning Fiberglas Corporation, Dept. RLC, Toledo 1, Ohio.*



Cushioning Device

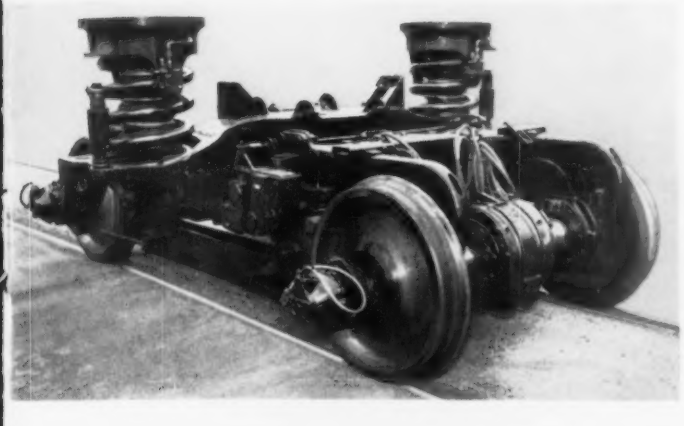
This cushion chain load restraining device has been developed jointly by Brandon Equipment and the Elgin, Joliet & Eastern for handling palletized tin plate in box cars and coiled plate on flat cars.

The box car equipment consists of steel straps welded to the vertical structural members in the sides of the car. Chains per-

(*Continued on page 54*)

Where railroad progress is cast in steel....

A new application in cast steel engineering for multiple-unit commuter cars . . . General Steel motor trucks of modern design provide extra riding comfort.



General Steel constantly finds new applications for proved designs in cast steel.

Through such creative engineering, the company has earned its reputation as the unique supplier of cast steel products for progressive railroads and other industries throughout the world.

Specify General Steel products . . . proved by performance to be your wisest investment.

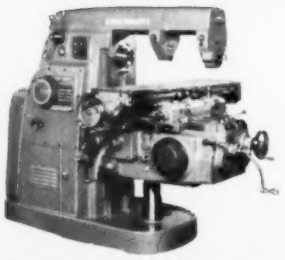
Latest cast steel design 4-wheel motor truck for use on multiple-unit commuter cars is based on tested and proved engineering principles. Combination air-coil bolster springs automatically maintain constant platform and coupler height, with coil springs supporting light weight of car and air springs supporting passenger load. Central Bearing subdues lateral shimmy and eliminates side bearing upkeep . . . increases mileage between wheel turnings and cuts maintenance costs.

GENERAL STEEL CASTINGS

GEARED TO PROGRESS
P R I
MEMBER

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

Dial Type convenience and ease of control is a big factor in producing multiple operation work at low cost.



CINCINNATI Plain Dial Type Milling Machine. Also Universal and Vertical styles. Built in Nos. 2, 3 and 4 sizes, 10, 15 and 20 hp. Catalog No. M-2003.

ARBOR-LOC is a big timesaver in interchanging the seven cutting tools on the table of the CINCINNATI Dial Type Milling Machine shown at the left.

EASY DOES IT

. . . for Dial Type Operators

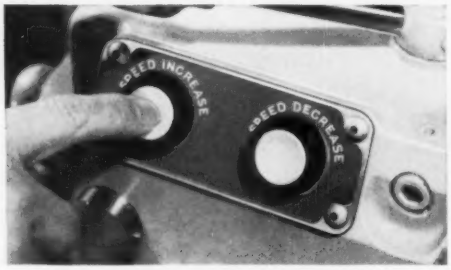
Ask the man who runs one. He'll tell you that CINCINNATI Dial Types are easy and convenient to operate and set up, and they help him maintain high quality . . . important considerations in low cost of production. Three operator-approved features of convenience are illustrated here.

Others include:

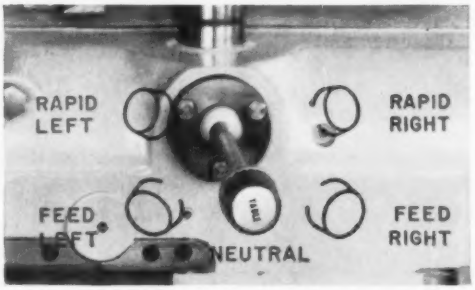
Automatic backlash eliminator for milling to the right or left . . . Power selection of 32 feeds . . . Independent directional control levers, with palm-fitting plastic knobs . . . Identification discs on all control lever knobs . . . Dynapoise chatter-damping overarm, automatically damps out chatter and improves finish on the work . . . Complete rear controls (plain and universal styles)

More information in our new comprehensive catalog No. M-2003. And if you must justify replacement, ask for a copy of our manual No. M-1838.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



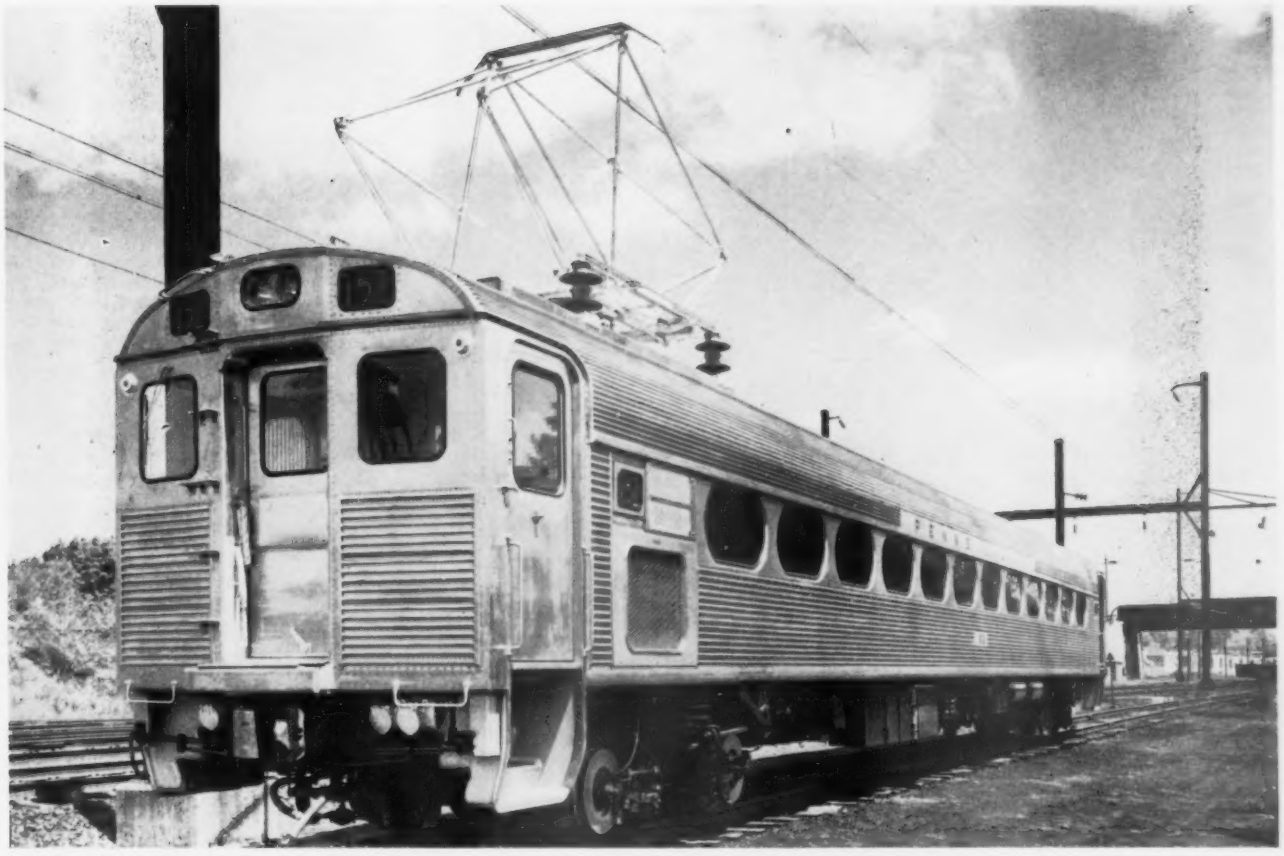
Push-button selection of 24 spindle speeds, throughout 16 to 1600 rpm range (18 to 1800 rpm for No. 2 Dial Types).



Five-position lever gives the operator complete one-hand control of the table (automatic cycle machines).

CINCINNATI®

Knee Type Milling Machines • Bed Type Milling Machines • Die Sinking Machines
Cutter and Tool Grinders



Pioneer with Budd trucks weighs 90,100 lb. Truck centers are 59 ft 6 in., and coupled length is 85 ft. Pantagraph working height varies from 25 ft 9 in. maximum to 15 ft 1 in. minimum. Polyester plastic is used for steps and battery boxes.

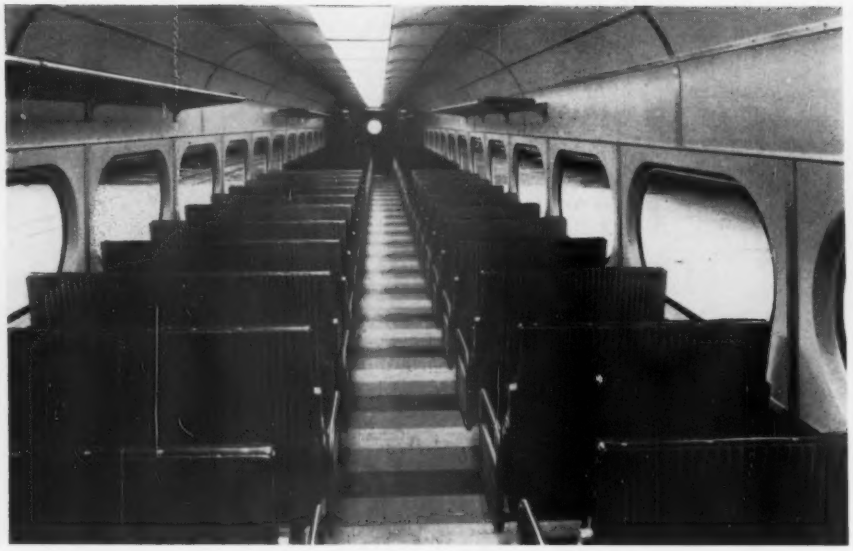
Budd Pioneers Go into Pennsy M-U Service

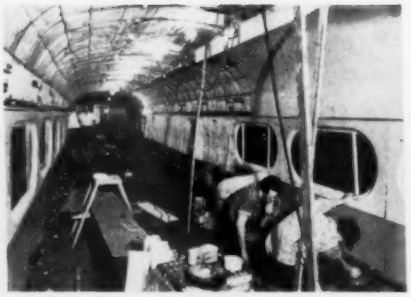
Tested lightweight car design has been equipped with traction equipment for electric suburban service.

PIONEER III went into revenue service for the first time in July. Two years after Budd unveiled this lightweight car design (RL&C, August 1956, p.49), the Pennsylvania began operating them in multiple-unit suburban service. The six cars just delivered to the Pennsy are the first Pioneers to be built with electric traction equipment. They are also the first railroad-owned cars of this type. Until now, only the original Budd prototype unit has been undergoing tests in the U.S. and Canada. This first Pioneer III has accumulated over 120,000 miles of high-speed, main-line operation.

Budd's lightweight car concept called for the longest possible body units, retention of the four-wheel truck, standard couplers and standard coupler height. Greatest departure was supporting the carbody at the side sills through air springs which made possible a single truck and body bolster, and a completely new truck design. The load path in the Budd-designed truck for these cars goes directly from the side sill to the bolster end through the air spring and then to the truck side frame through Teflon side bearings.

The bolster of this truck is hollow and forms a reservoir for the air springs mounted at each end. Orifices meter flow between the springs and the reservoir to control sway and vertical oscillation. The direct load path eliminates the center plate as a load carrying member. Instead it serves as a pivot and tram point for the two side frame assemblies. Inboard Timken axle bearings are mounted in rubber rings at the ends of these hollow, welded side frames.





Above: Roofs and walls of these stainless steel car bodies are insulated with 2½ in. of Aerocor. Tinted glass installed in polyester plastic unit, forms window frame and half of each adjacent pier panel. Plastic panels, each two bays long, form ceiling and sides of overhead air duct.

Left: Flip-over seats have stainless backs, plastic cushions and upholstery. Bulkheads and lower sides are lined with ⅛-in. melamine-faced plastic and floor covering is vinyl-asbestos tile.

Three cars have this Budd truck. It was designed originally for the installation of traction motors and is fitted with them for this application.

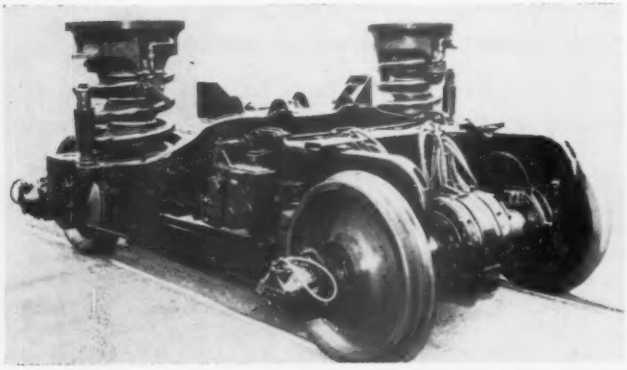
The other three cars are equipped with a newly designed General Steel Castings inboard-bearing truck. It incorporates equalization and a one-piece truck frame. The frame is supported by equalizer coil springs to minimize the unsprung weight. The cast steel frame also aligns the axles. The load of the carbody is carried by combination air and coil springs with the coil springs carrying the weight of the car and the air springs compensating for variations in passenger load. These springs are supported by a truck bolster swivelled at the truck frame through the GSC central bearing.

The new cars were not built to be operated in multiple unit with the Pennsy's existing electric equipment. They must, however, operate at the same high-level station platforms. While the original Pioneer III design does have standard couplers and coupler height, the vestibule platforms are about 12-in. lower than standard. On the new cars, the entire carbody has been raised about 1 ft. The underframe construction then had to be altered and strengthened because of greater coupler eccentricity. This underframe finally resembles that of an RDC even to its low-alloy, high-tensile welded end-underframe units. All of the changes add about 700 lb to the underframe weight.

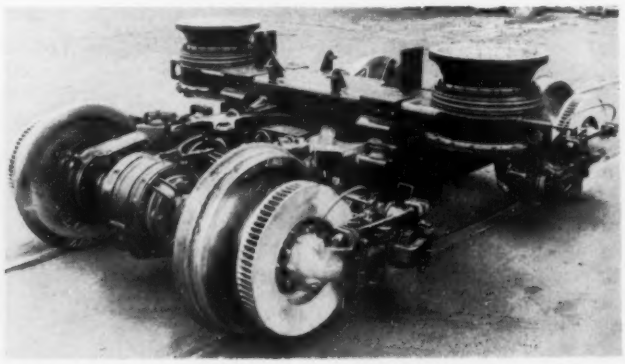
All cars have control stations at both ends. Providing these vestibules at each end is another departure from the original Pioneer III design. The cars are equipped with a Westinghouse 26-MU brake system, in which the brake cylinder pressure is varied with the passenger load. Each car has a Westinghouse 3-YC, 20-cfm air compressor, driven by a 6-hp d-c motor. The cars with the Budd trucks have outboard disc brakes. The cars with GSC trucks have Westinghouse package tread brake units with Cobra shoes. Retardation rate in emergency is 2.5 mph per sec.

The Westinghouse Electric traction equipment is capable of accelerating a fully loaded six-car train to a balancing speed of 90 mph on level track. Acceleration of these fully-loaded cars is 1.2 mph per sec. Eighteen control steps provide this acceleration.

There are three running positions. In switching position, the four motors with shunted fields are connected in series to provide starting tractive force. In the series running position, the motors operate full field and resistance is cut out in seven steps. In the full-speed position, motors are reconnected by a bridging transition to series-parallel. When all



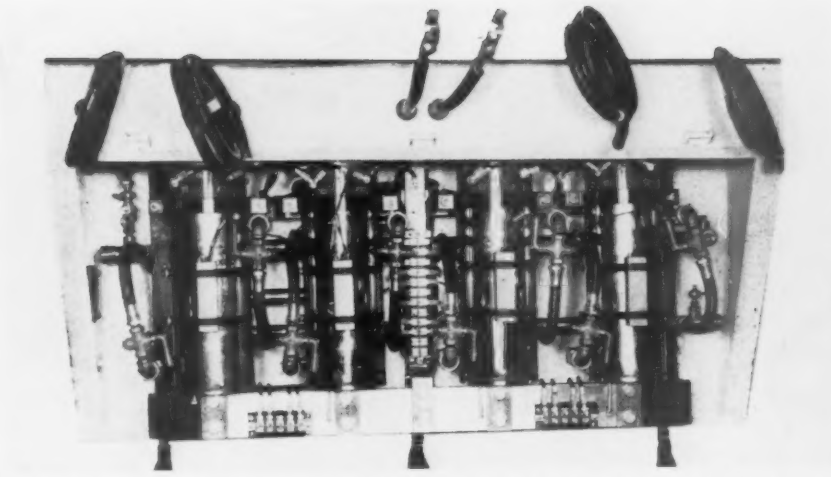
General Steel Castings inboard bearing truck is equalized and has rigid one-piece frame which provides positive alignment for the Timken tubular axles. Combination coil and air springs, supporting car body at side sills, are arranged so weight of light car is carried on coils and passenger loads are leveled with air springs. These 13,750 lb trucks have Westinghouse package brake units.



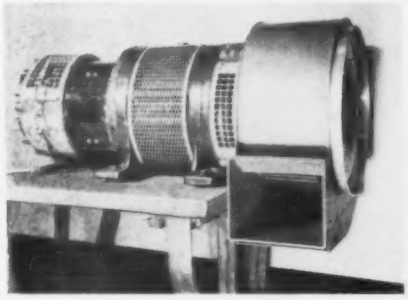
Budd lightweight truck has changed but little as a result of two years of road tests. For the first time this Firestone air-spring truck is fitted with traction motors. Outboard disc brakes are of double-surfaced, finned type. While three cars have this truck, all have 30-in. wheels, Timken roller bearings, Westinghouse traction motors, and Spicer hypoid drive units. Truck weighs just under 6 tons.

Partial List of Suppliers

Gear drive units	Spicer Mfg. Div., Dana Corp.
Journal bearings and tubular axles	Timken Roller Bearing Co.
Shock absorbers	Houdaille Industries
Sound deadening pads	Fabreeka Products Co.
Truck castings	General Steel Castings Co.
Truck springs	Crucible Steel Co. Firestone Industrial Products Co.
Wheels and wheel assemblies	Standard Steel Works Div., Baldwin-Lima-Hamilton
Air brake equipment	Westinghouse Air Brake Co.
Hand brake	National Brake Co.
Air conditioning equipment and lighting	Safety Industries, Inc.
Batteries	T. A. Edison Industries, McGraw Edison
Drive couplings	American Flexible Coupling Co.
Heaters and controls	Vapor Heating Corp.
Jumpers and receptacles	Pyle National Company
Traction equipment	Westinghouse Electric Corp.
Coupler and yokes	National Malleable & Steel Castings Co.
Draft gears	Waugh Equipment Co.
End underframe units	Youngstown Steel Car Corp.
Filters	Air Maze Corp.
Glazing rubber	Inland Div., General Motors Corp.
Grilles	Barber Coleman Co.
Handholds	Railway Specialties Corp.
Plastic-faced panels	U. S. Plywood Corp.
Penta-treated plywood	Joslyn Mfg. & Supply Co.
Vinyl-asbestos floor tiles	B. F. Goodrich Co.
Vinyl-covered aluminum	Met-L-Wood Corp.
Window glass	Pittsburgh Plate Glass Co.
Bag racks	Adams & Westlake Co.
Curtains	Pantasote Co.
Seats	Coach & Car Equipment Co.
Seat cushions	Goodyear Tire & Rubber Co.
Seat upholstery	U. S. Rubber Co.
Paint	Sherwin-Williams Co.



Four Westinghouse Ignitrons are mounted in an enclosure attached under the center sill. Two pairs of these rectifiers, each connected in parallel, take 780 volt a-c from separate taps on transformer secondary. The 650 volt d-c output side has two reactors which limit current ripple to point where good commutation is obtained on traction, air compressor, and air conditioning motors.



Blower-generator-pump set driven by 234 volt induction motor provides ventilating air for rectifier radiator, main transformer and reactors. Water pump circulates cooling water through rectifier tubes. Cumulative compound generator produces 45 volt d-c.

Traction motors, four per car, are 300 v d-c, series wound, commutating pole type. Each two-bearing, self-ventilated motor is directly connected to its Spicer hypoid gear drive unit through a flexible coupling. Motors are mounted on car centerlines.

resistance is cut out, the motors are shunted to provide maximum speed. Acceleration is automatic under the control of the current limit relay.

Alternating current at 11,000 volts is taken from the catenary and fed to an Inerteen-filled, 418-kva transformer with a 1,560-volt secondary. Five secondary taps supply the various car circuits. Four Ignitron rectifier tubes, two pairs in parallel, are fed from two separate 780-volt a-c power circuits. Their 650-volt d-c output supplies the traction motors, the 3-kw motor alternator for 115-volt a-c fluorescent lighting, and the motor on the air compressor and air-conditioning equipment.

The cars are heated with 624-volt a-c power taken from a separate tap. Control equipment and other auxiliaries are powered from a 234-volt a-c circuit. This a-c power is converted to 45-volt d-c in a blower-generator-pump set. The 75-amp-hr Edison battery is charged from the output of this m-g set. Cooling and heating controls, headlights and cab lights, and cab signal equipment, are also arranged for this nominal 32-volt d-c operation. A new feature in the d-c generator control is use of a silicon rectifier as a blocking diode to prevent the battery from discharging into the generator and operating it as a motor when the blower-generator-pump set is shut down. The blocking diode replaces a relay and contactor used on the older cars.

By adopting the three-two seating arrangement, it has been possible to accommodate 125 passengers on each of the three cars which have toilets, and 128 passengers on the cars without toilets. The seats are on 32-in. centers. They are special lightweight "flip over" units with Pliofilm cushioning, Trilock covering, and stainless steel frames and backs.

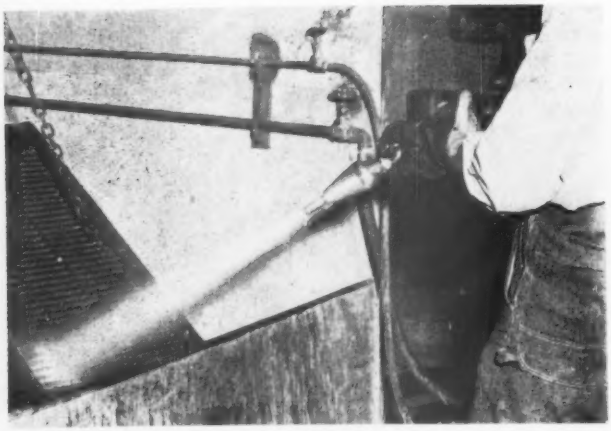
Each car is heated by strip-type wall-mounted electric resistance units of 20-kw capacity combined with a 24-kw overhead unit which is part of the air-conditioning unit. The eight-ton Safety Industries air-conditioning system circulates 2,400 cfm, of which approximately 25 per cent is fresh air. For capacity control, the cooling coil is split horizontally.

While the air-conditioning condenser and compressor of the original Pioneer III were a-c powered and could be mounted in a locker at B-end of the car, the new cars have the compressor resiliently mounted beneath the car and driven by a 13.8-hp, 650-volt d-c railway-type motor. The air-cooled condenser is mounted in the locker and cooling air is drawn through an inlet grille in the car side and discharged through an opening in the car floor.

Ignitron m-u cars combine the advantages of high-voltage a-c transmission with the superior characteristics and lower maintenance of d-c traction motors. The reliability of this type of equipment has been proven by 100 Ignitron m-u cars in service on the New Haven for the past four years. On these latest units, for the PRR, the car bodies, fittings, trucks and electrical equipment have all been designed for long life and low maintenance.

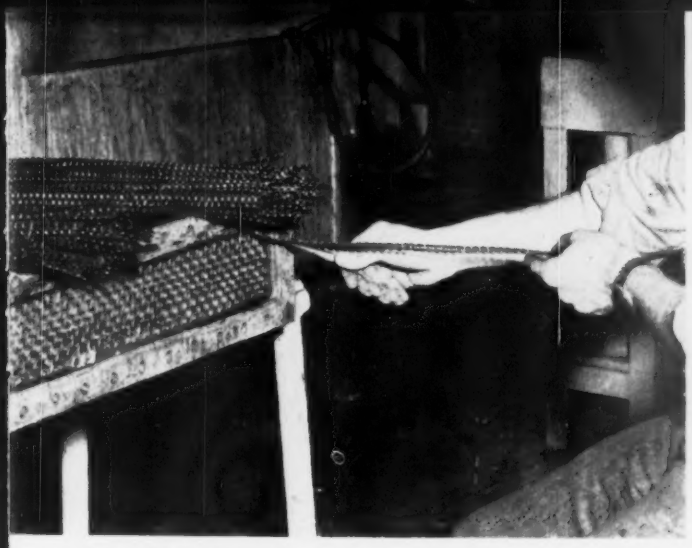
Stripped down radiator gets hot cleaning bath for 10 min to remove dirt and grease deposits.

Here's How the Frisco Overhauls



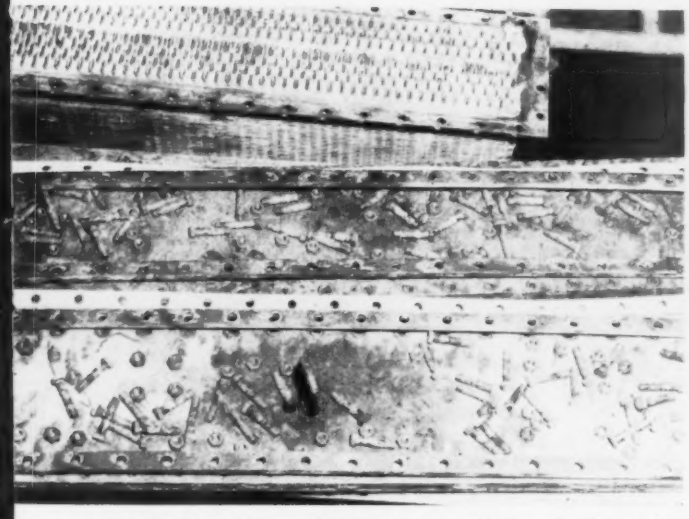
Hot water and steam complete cleaning in adjacent special stall. Overhead crane facilitates handling.

Centralized facilities in the diesel shop at Springfield, Mo., handle all types of radiators and heat exchangers on a production basis. Performance of repaired units is assured with complete testing.

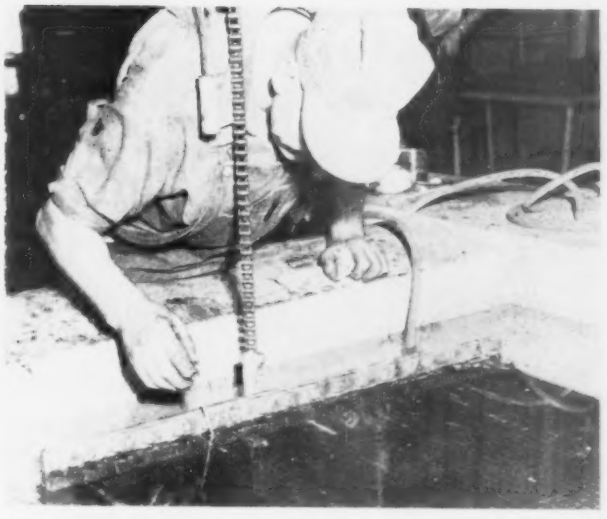


Oil cooler has its cores removed, cleaned and replaced. These passages frequently are trouble source.

Radiator is cleaned by inserting cleaning rod in core slots to remove stubborn deposits accumulated there.



Special blanking plates are bolted to the top and bottom of radiator (either oil or water) for pressure testing.

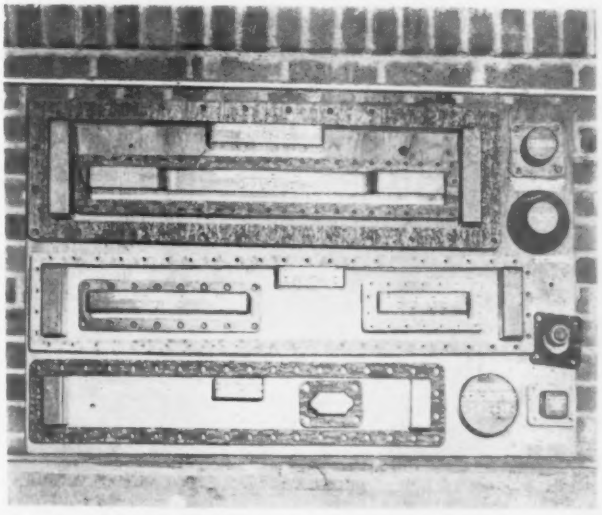


Leak is found by man testing radiator at 15 psi pressure in special water vat. Oil coolers are tested at 20 psi.

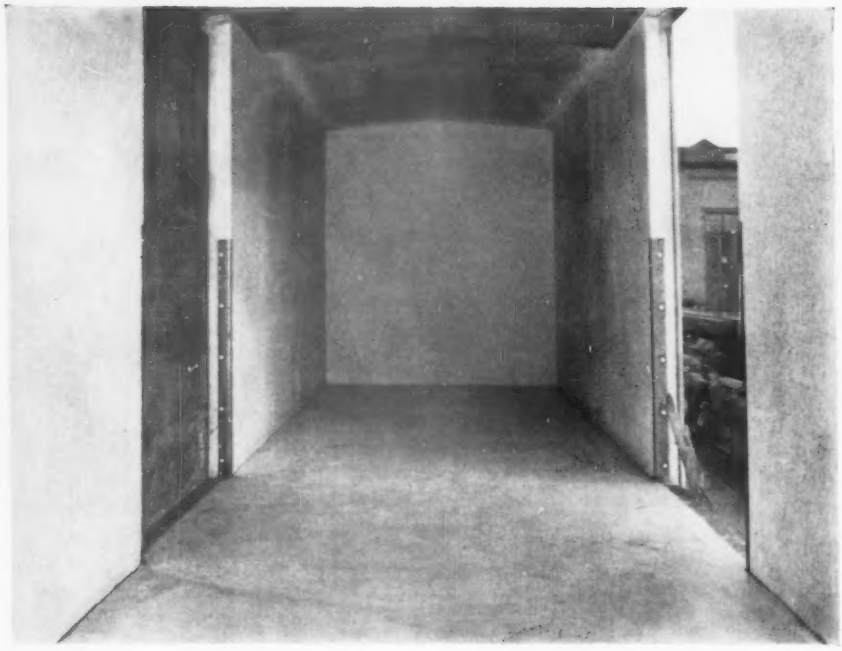
Radiators

Radiators, intercoolers and heat exchangers on diesel locomotives require considerable maintenance. They must be kept clean internally and externally so that the fluids which flow through and around them can do an adequate heat transfer job. The tubes and fins are easily damaged and are subject to vibrations which also cause failures. It is essential that a large component like a radiator section be tested and in good condition before it is installed in a locomotive because its removal and replacement is complicated and costly. Any failure in a heat exchanger can be complicated.

The Frisco has through the years since its dieselization continuously improved its maintenance methods. The shop at Springfield, Mo. (*Railway Locomotives and Cars, April 1955, page 84*), has been equipped to handle the road's present 413 diesel units. Here we see the procedures used at the Springfield shop in the rebuilding and testing of radiators. The cover view shows the soldering of a leak found in one of the cores during the water test.

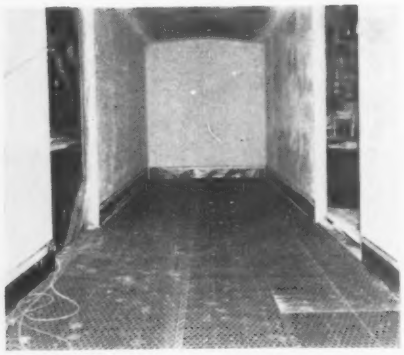


Special rack for all gaskets is located adjacent to final station. Here new gaskets are installed and radiator goes to shop for installation in one of Frisco's diesel units.



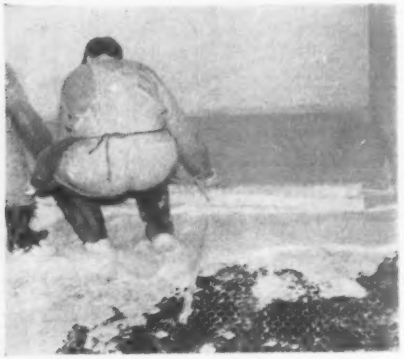
Great Northern box car with Plastinail floor is ready to go back into service. Subsequent repairs to such a floor are not complicated. Cars are relined at the time that floor is rebuilt.

Great Northern Applies Cement Flooring



Car floor covered with felt paper and wire mesh is ready for oxychloride cement.

Wet Plastinail is then worked into the bonding structure formed by wire mesh.



Cement is struck off to proper thickness by using ⅞-in. OD pipe as a guide.

Troweling of poured floor is final operation. After drying, car is complete.

THE GREAT NORTHERN has been applying Plastinail flooring to five cars a week at its Hillyard, Wash., yards. The complete procedure for each car takes about 18½ hr from start to finish, with several cars going through various stages simultaneously. The GN first successfully tested Plastinail in November 1949 and has been using it in 50-car blocks since 1955. As a result of this experience, the road has established an efficient method for applying this flooring.

All material is supplied by the manufacturer, F. E. Schundler, of Joliet, Ill. Normally shipped in carload lots, the material required for a standard 40-ft car costs $178 for a 1-in. thickness of Plastinail on the floor. This includes 1,300-lb of Plastinail, 800-lb of magnesium chloride, 15-lb of nails, 400 sq ft of wire mesh (17 gage, 1½-in. diamond) and saturated felt paper (15 lb), and 3 gal of sealer. While the GN uses a 1-in. thickness, a ¾-in. thickness is sometimes possible, depending on the supporting floor and car structure, at a cost of about $138 a car.

The first step is making minor repairs to the old wood floor. Loose or broken boards are tightened or replaced, if necessary. Then the 15-lb saturated felt paper is laid and lapped over the wood to allow the Plastinail

deck to deflect independently. The wire mesh is then nailed on 6-in. centers. This wire acts both as reinforcement for the composition flooring and as a mechanical key between wood and the flooring material. The surface is then ready for application of the new flooring.

Preparing the Mix

The material can be mixed either by hand or in a standard power-driven mortar mixer, as used by the GN. A 6½ cu ft electric mixer will produce the mix required for a standard 40-ft car in about 30 min. Each batch is mixed for about 5 min. A wheelbarrow is used to transport mix to the car for spreading.

The only critical operation is putting the correct amount of magnesium chloride in the water that is used for wetting the Plastinail. Two 100-lb bags of the chloride are mixed by combining them with sufficient water so that the mixture fills a 55-gal drum to a point 7 in. from its top. This solution is then used to wet the material so that the mixed cement has a 7-in. slump. It is then ready for pouring.

A ⅞-in O. D. pipe is placed on the floor to determine the thickness of the poured material; it is removed before darbying. The Plastinail is poured in from both ends toward the middle of the car. After pouring, it is worked into the wire mesh to assure a good bond. Following this, it is stuck off level with a ⅞-in. pipe, which with the ⅛-in. thickness of the wire mesh gives a 1-in. thick layer. After the entire car floor has been covered and struck-off, the pipe is removed and the floor darbied to remove the marks left by the pipe and the straight-edge.

After darbying, the flooring is allowed to harden for final steel troweling. During this period another car floor is papered and wired in preparation for pouring of the flooring.

Hardening of the floor is determined by the temperature of the water used and of the surrounding air. The hardening reaction is oxothermic and once started will acquire final hardness without need for external heat. Extremely cold weather only delays initiation of the reaction and will not interfere with it once it starts. Virtually impossible to freeze, the mixture will not suffer from cold but will merely stay plastic longer in the 0 to 20 deg range, so that more hours are required to effect a set.

When the chemical hardening is complete, 3 gal of the sealer is applied to the surface. The floor is water resistant, non-abrasive, and fireproof. Any minor damages to the monolithic surface can be quickly patched using a small quantity of the material as a patching plaster.

Ceramics Work in C&EI Diesels

C&EI tests show ceramic coated piston head is effective in maintaining clean lube oil.

CLEAN CYLINDER WALLS, combustion chamber, exhaust ports and rings are the result of application of two opposite test pistons with ceramic coated crowns to an EMD 567-C engine on the Chicago & Eastern Illinois. Since December 12, 1957, when the pistons were installed, the engine has operated about 70,000 miles.

The coating is a mixture of rare earth oxides containing ceria and the application is simple. The piston crown is shot-blasted with G-25 steel grit and the material is applied from 0.004-in to 0.006-in. thick with an oxy-hydrogen flame. Magnetic thickness gauge measurements show no variation in thickness. The coating provides insulation, a high surface temperature, and has the abiility to re-radiate heat.

The process came to the attention of the railroad through the Armour Research Foundation. Last fall, Armour added a new type of ceramic catalytic coating to its flame ceramic process. Many industrial applications use this, or similar coatings. They provide excellent wear surfaces, abrasion resistance, high-temperature electrical insulation, and resistance to molten metal. High temperature applications have been made in rockets and missiles. Laboratory tests on a Chevrolet engine with the piston crowns coated showed unburned hydrocarbons reduced as much as 40 per cent. Other tests on a Fairbanks-Morse engine showed the coated piston operating at temperatures 180-deg lower than those of the uncoated pistons.

Of equal importance was the condition of the lube oil. On April 22, a 1500-hp locomotive was placed in passenger service with its engine equipped with sixteen coated pistons. At the 20,000 mile check on July 3, the lube oil was compared with that in another engine in service the same length of time. The oil in the test engine was very clean. There was no change in color from oxidation products, which indicated more complete combustion. Filter mileage has been extended from 1 month to 2 months. An iron analysis was run which showed 25 parts per million for the engine with the uncoated heads and only 15 parts per million for the coated heads.

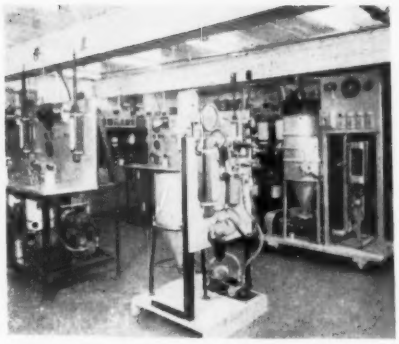
A standby engine has been equipped with sixteen coated heads and will be installed in the near future and subjected to a load test. The C&EI expects some interesting data. On the basis of present tests, it is believed a 30 cetane fuel will give the same results as a 50 cetane fuel. With more complete combustion of fuel, it might be possible to attain maximum horsepower at reduced power piston setting with a resultant savings in fuel.

RDC Pistons Coated

The C&EI has coated some piston heads for its spare Detroit GM diesel for its RDC. These small high-speed engines create considerable unburned carbon when using heavy, low-cetane furnace oil. The coating is intended to alleviate the dirty lubricating oil condition this creates, and should extend filter and oil change periods while lengthening the life of the engine itself. An exclusive license for world wide rights for the process has been obtained by the Continental Coatings Corporation of Chicago from the Armour Research Foundation.

Other test applications of different types of coatings in the railroad field include EMD liners coated with rutile (titanium oxide). The material is applied so that the finished size is 0.005-in. thick on each side, a total of 0.010-in. on diameter. It is said to give an extremely hard coating with a high surface porosity. Another test will be conducted with the piston crown and head coated with the rare earth oxides, to determine any reduction in thermal cracking. At present, no information is available as to the probable life of the ceramic coating.

Improving Diesel Fuel Filtration



Laboratory equipment includes oil reservoir, pump and filter equipment mounted on test stand.

FILTRATION must maintain cleanliness and, at the same time, cause a minimum pressure drop in fuel systems. Pressure drop beyond tolerable limits can be as serious as contamination because the reduced flow starves the fuel injection pump, and may cause pump damage and loss of power.

In any study of filtrants the two factors, *cleanliness* and *pressure drop*, must be considered simultaneously and in their relationship to each other. In this laboratory test, a filtrant is disqualified that captures and hold contaminants but reduces flow by excessive differential pressure build-up before a target life cycle of 60 hr. Conversely, a filtrant that maintains a high flow rate yet permits contamination beyond set limits, as measured by precipitation number, is also considered deficient.

A locomotive manufacturer for many years has supplied the second-stage filter cartridge designated as "A" in this study as original equipment. In most cases, this cartridge is considered the standard with which all replacements are compared. White cotton thread waste cartridges (CI-1129C) have been the most popular replacements for the original equipment cartridge.

The difference in performance between conventional filter cartridges is well illustrated in comparing cartridge "A" and the waste-packed cartridge. The test life of cartridge "A" is 50 hr as compared to 5 hr for the waste cartridge. The popularity of the waste-packed cartridge in terms of filtration efficiency is apparent. The waste unit operates throughout its flow life at high efficiency, maintaining contamination levels at trace amounts. Cartridge "A," on the other hand, permits a very sharp rise in precipitation number to .034 and after 16 hr contaminant levels are finally reduced by cartride "A" but never reach the "trace amounts" effectiveness constantly maintained by the waste cartridge.

The objective in developing new second-stage filtrants for locomotive fuel service is threefold: (1) extend service life beyond that of the standard "A" cartridge; (2) match the high filtration efficiency of cotton waste, and (3) achieve these results while maintaining a high rate of flow.

This study was made to determine the relative merits of three filtering materials as jointly compared with the standard "A" filter and cotton waste. These are designated as "R", a rayon filter identical in construction to type "A"; "P-1", a newly developed pleated filtrant, and "P-2", a conventional pleated filtrant.

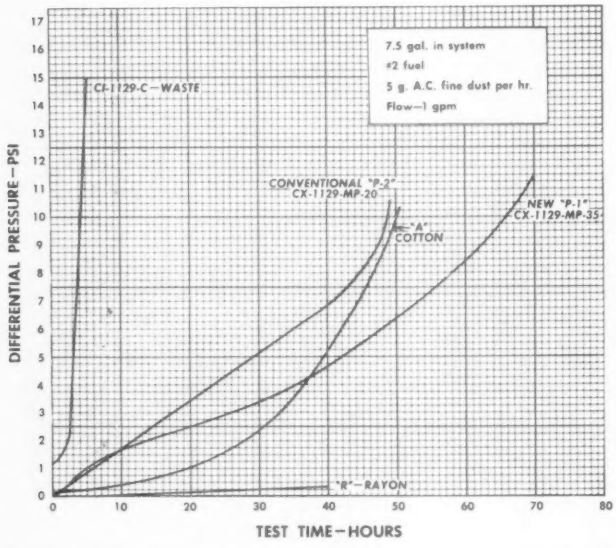
All filters operated under precisely controlled conditions using 7.5 gal of clean No. 2 fuel oil with a constant flow of 1 gpm. Every hour of the test 5 grams of AC fine dust (recognized fuel test contaminant) were added to the system. Hourly readings of differential pressure and contamination (ASTM precipitation number) were recorded.

The performance of the "R" (Rayon) filter was so erratic that continuance of tests beyond 40 hr was considered of no purpose. The steep rise in contamination in the first 30 hr indicated the material's filtering ability is highly questionable although differential pressure is low.

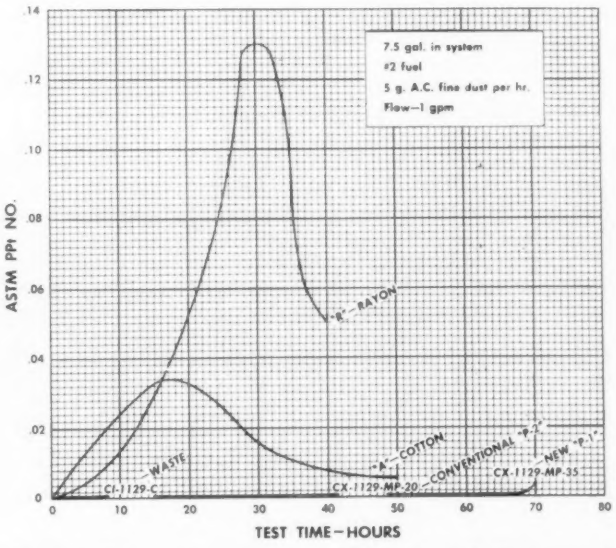
Both pleated filters show the same ability to remove contaminants. Contaminant level does not rise until after 70 hr. The differential pressures do vary. P-2 (the standard paper) exhibited a uniform pressure rise to 45 hrs and then rose sharply.

P-1 (the new pleated filtrant) developed a much less steep curve and did not attain the critical 10 psi point until 65 hr of test. Field tests are now being conducted on the new P-1 filtrant. Reports received to date confirm the results obtained in the laboratory as to the removal of contaminants, improved flow rate and extended life.

This article by James Wilson and Ralph Young, Engineering Dept., Wix Corp., Gastonia, N.C., is based on a study of second-stage fuel oil filtration made in the Wix laboratories.



Pressure drops across series of different filter media were one step in determining ultimate life.



Cleaning efficiency was measured by checking dirt which filters removed from circulating oil.

LEARN AIR BRAKES WITH

COLOR SCHEMATICS

AB Brake Equipment *Installment 2E*

Slide and Graduating Valve Connections

This is the fifth installment in the series on the AB brake. The color chart for this series was published with the first installment in the November 1956 issue, p 87. The purpose of this fifth part is to present a series of diagrams explaining the slide valve function in both portions of the brake valve. All of these positions will then be available in ready reference form.

Service Portion
Charging Position

In coloring Sketch 20, begin with the dark green pencil. Color sequences 1, 2 and 3 but do not carry this color into the passage leading through the slide valve to the emergency reservoir. Stop the green color at the point where this passage begins (at the slide valve upper face). Dampen and let dry.

With an orange pencil, color the passage to the emergency reservoir described in sequence 4. Begin where the green color ended at the top of the slide valve. Dampen and let dry. With a yellow pencil color sequence 5. With a pink pencil in dashes, color sequence 6.

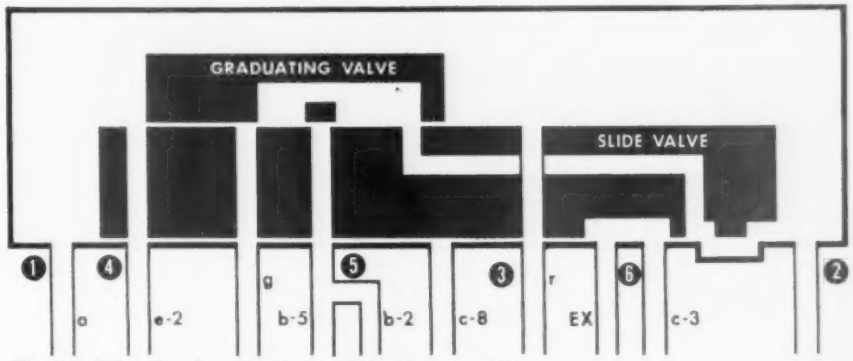
Service Portion
Preliminary Quick Service

To color Sketch 21, again begin with a dark green pencil. Fill in the space around the slide and graduating valve and the connecting passages. Dampen with the small brush and let dry. With a yellow pencil, fill in cavity G in graduating valve and the connecting passages to the release insuring valve, brake pipe, and quick service volume. Dampen and let dry.

With an orange pencil, fill in the passage to the emergency reservoir which is blanked by the graduating valve. Dampen and let dry. With a pink pencil in dashes, fill in cavity B in the slide valve and the two connecting passages—one to the retaining valve and the other to the brake cylinder. Dampen and let dry.

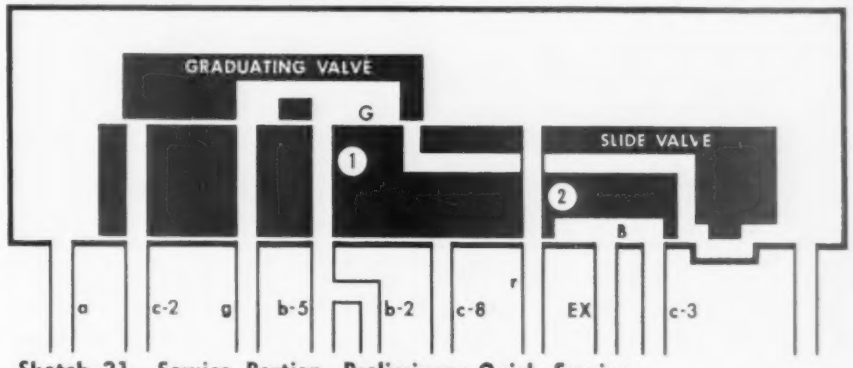
Service Portion
Service Position

To color Sketch 22, proceed as follows: With the dark green pencil fill in the



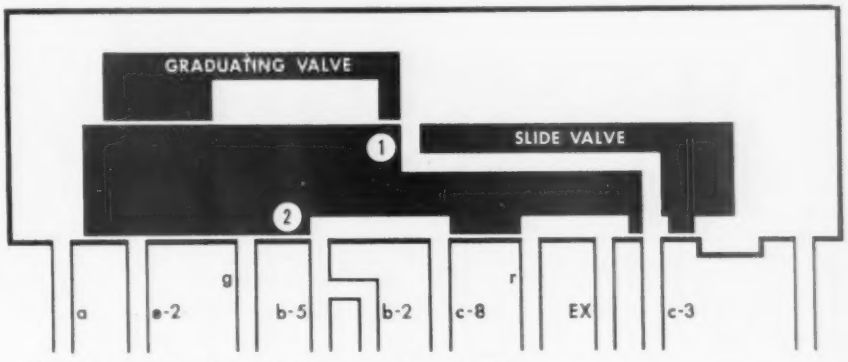
Sketch 20—Service Portion—Charging Position

Connections are as follows:
1. Auxiliary Reservoir *(a)* to space above Slide and Graduating Valves.
2. Auxiliary Reservoir *(a)* to Release Insuring Valve—Pressure Face.
3. Auxiliary Reservoir *(a)* to Release Insuring Valve—Exhaust Face *(r)*.
4. Auxiliary Reservoir *(a)* to Emergency Reservoir *(e-2)*.
5. Brake Pipe *(b-5)* to face of Graduating Valve and to Release Insuring Valve Diaphragm *(b-2)*.
6. Brake Cylinder *(c-3)* to Retaining Valve *(Ex)*.



Sketch 21—Service Portion—Preliminary Quick Service

1. Brake Pipe air *(from b-5)* flows to cavity G in Graduating Valve and to Quick Service Volume *(g)*.
2. Auxiliary Reservoir air passes through Slide Valve to Release Insuring Valve *(r)*.



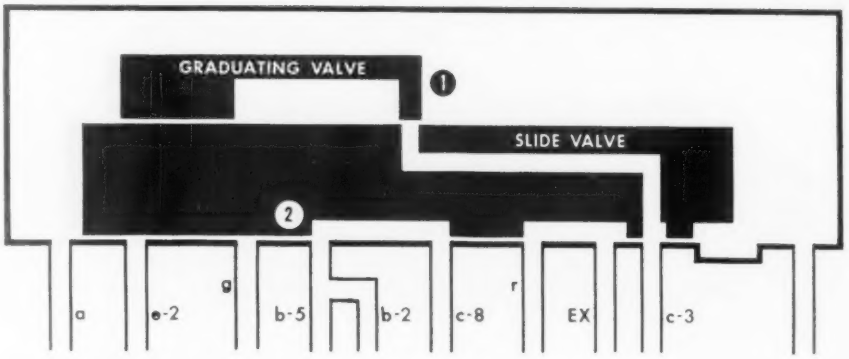
Sketch 22—Service Portion—Service Position

1. Auxiliary Reservoir air *(from a)* flows past Graduating Valve to Brake Cylinder *(C-3)* passage.
2. Brake Pipe air *(from b-5)* goes through Slide Valve cavity to Quick Service Limiting Valve *(c-8)*.

space around the slide and graduating valves and the passages at each end of the sketch. Stop the green color where the brake cylinder passage begins at the top of the slide valve. Dampen and let dry.

With a yellow pencil, fill in the cavity in the slide valve which connects the passage from the brake pipe to the quick service limiting valve.

Starting at the top of slide valve with a pink pencil, fill in the passage to the brake cylinder. With an orange pencil, fill in the passage to the emergency reservoir which is blanked by the slide valve.



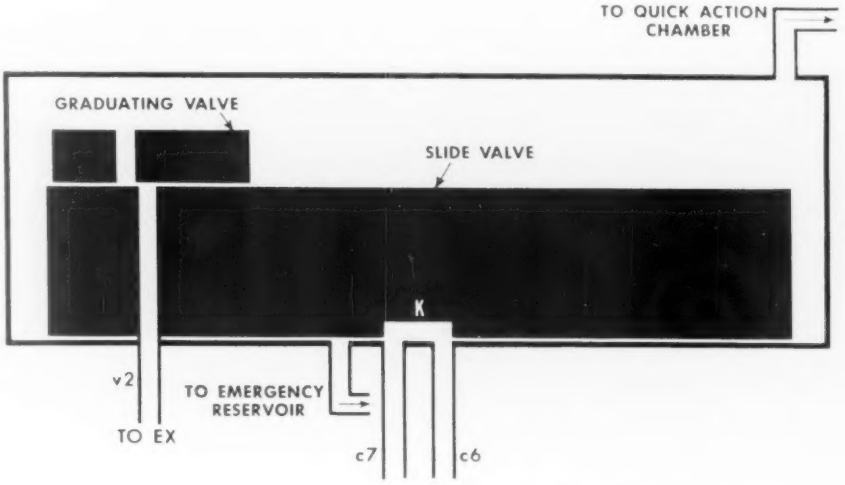
Sketch 23—Service Portion—Service Lap Position

Connections are as follows:
1. Flow from Auxiliary Reservoir *(a)* to Brake Cylinder *(c-3)* is blanked by Graduating Valve.
2. Brake Pipe *(b-5)* is connected to Quick Service Limiting Valve *(c-8)* by Slide Valve cavity.

Service Portion
Service Lap Position

To color Sketch 23, proceed with the dark green pencil. Fill in the space around the slide and graduating valves and the two passages at the ends of the sketch. Dampen and let dry. With a yellow pencil, fill in the brake pipe passage, the cavity in the slide valve and the passage to the quick service limiting valve.

With a pink pencil, fill in the passage to the brake cylinder which is now blanked at the graduating valve. With an orange pencil, fill in the passage to emergency reservoir which is blanked at the slide valve. Dampen and let dry.



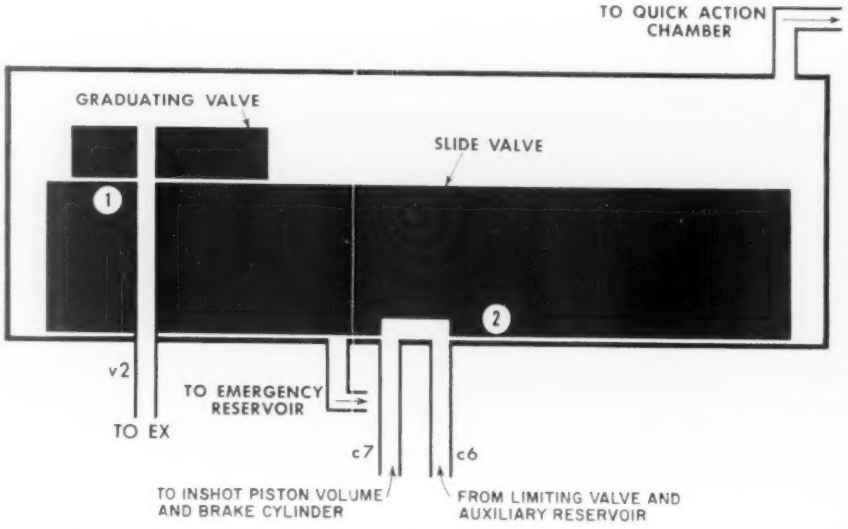
Sketch 24—Emergency Portion—Release and Charging Position

No flow of air at this time.

Emergency Portion
Release and Charging Position

With a heliotrope pencil begin Sketch 24 by filling in the space around the slide and graduating valves and the passage to the quick action chamber. Color in heliotrope dashes passage v2 to **EX** which is blanked at the slide valve. Dampen and let dry.

With a pink pencil, in dashes, fill in cavity *K* in the slide valve and the two connecting passages. Dampen and let dry. With an orange pencil, fill in the passage to the emergency reservoir which is blanked at the slide valve.



Sketch 25—Emergency Portion—Service Position

1. Quick Action Chamber to exhaust *(EX)*.
2. Brake Pipe and Auxiliary Reservoir to inshot piston volume brake cylinder in First Stage Service, and from Auxiliary Reservoir only, in Second Stage Service.

Emergency Portion
Service Position

To color Sketch 25, proceed with the heliotrope pencil, filling in the space around the slide and graduating valves and the passage to the quick action chamber. Fill in passage v2 to **EX.** Dampen and let dry. With a pink pencil, fill in cavity *K* in the slide valve and the two connecting passages. With an orange pencil, fill in the passage to the emergency reservoir.

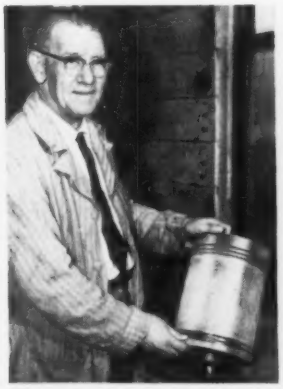
ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL RR

FIRM BAMBERGER RAILROAD CO.
Salt Lake City, Utah

5 years without overhaul on RPM DELO Oil

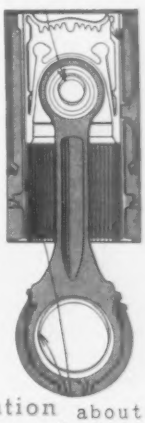
Lubricated with RPM DELO Oil RR since going into service, three switch locomotives of Bamberger Railroad have worked over five years without a major overhaul. "The oil does such a good job of protecting engines that I've never had to repair or replace a part because of faulty lubrication," says General Shop Foreman J. F. Buckley (below). "Every time we've opened the engines for inspection we've found them clean, free of carbon or lacquer deposits." Bamberger hauls general freight between lines of UP, WP, SP, and D&RGW over 36.9 miles of its own mainline track between Salt Lake City and Ogden.



Clean piston (above) has no measurable wear, shows the kind of performance Bamberger gets with RPM DELO Oil RR. "We simply wipe off parts and they're bright and shining," says Mr. Buckley. Firm's EMD 800's (#601 top right, #602 above) deliver cars to sidings and make up trains for larger locomotive—work an average of 16 hours a day. Engine #570 (top left) makes the Salt Lake-Ogden run, works 10 to 12 hours daily.

Why RPM DELO OIL RR
reduces wear, corrosion

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists foaming



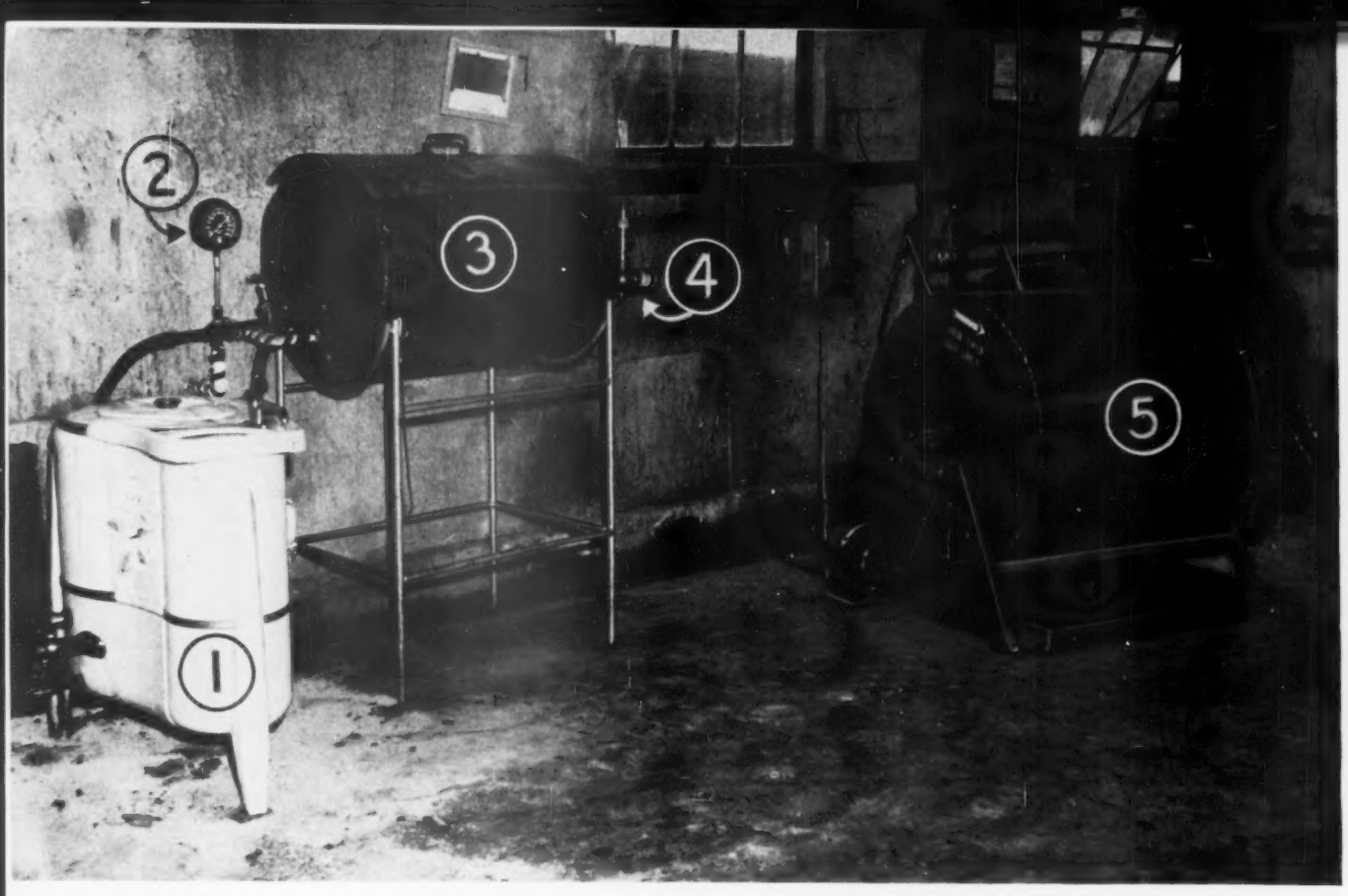
For More Information about RPM DELO Oils or other petroleum products of any kind, or the name and address of your nearest distributor, write or call any of the companies listed below.

LUBRICATING OILS RPM DELO

TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado



Lubricator laundry includes (1) washing machine, (2) oil temperature gauge, (3) oil supply, (4) thermostatic valve, and (5) tumbler.

Northern Pacific's Approved Lube Pad Cleaner

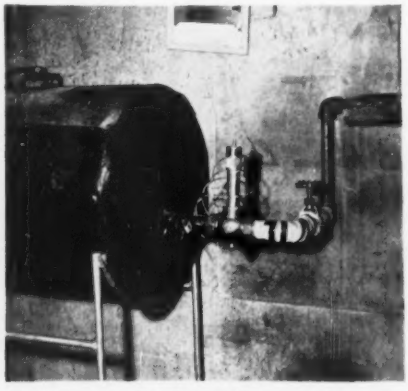
THE NORTHERN PACIFIC took the housewife's Easy Spindry washer, added oil supply, a heater and a tumbler, and came up with a simple, inexpensive lubricator pad renovator. The cleaning procedures meet all requirements of AA Spec. M-910A-57.

The oil storage tank is made from a a 55-gal steel drum, insulated with sheet asbestos, and supported in a horizontal position next to the washing machine. The drum is equipped with a strainer screen placed under the return pump outlet to catch whatever lint and other material is forced through the special filter screens. Steam to the pipe coils in bottom of drum is controlled by a Crane Company thermostatic valve, which keeps the car oil at 240 deg. F. An additional double screen filter is installed at the washing machine through which the oil is pumped to the washing side. Rubber gaskets in the washer are replaced with neoprene.

The shop-made 36-in diameter wire-mesh tumbler is equipped with a ½-hp motor. It operates at about 15 rpm, using hoisting gears from an old Evans auto loader for reduction gears. The tumbler has a plywood shelf 18 in. wide, extending from the rotating shaft to the outside periphery. An additional partial shelf extends out on the opposite side, leaving a space of about 14 in. between it and the shaft. The pads are placed side by side in the tumbler, and the rotating action plus the partial shelf turns them over until they reach the half shelf, then they drop to floor of the tumbler. This action removes much of the loose dirt, grit and lint from the lubricator.

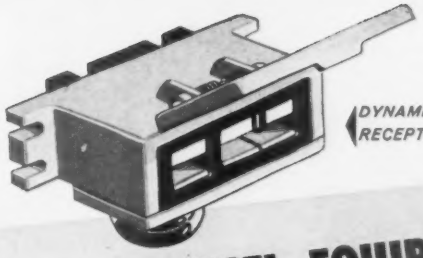
(*Continued on page 36*)

Filter on tank (in raised position) is placed under pump outlet to remove foreign materials.



Thermostat on oil tank steam line maintains necessary temperature of 240 deg F in coils.

LOOK FOR THIS
MARK OF QUALITY!



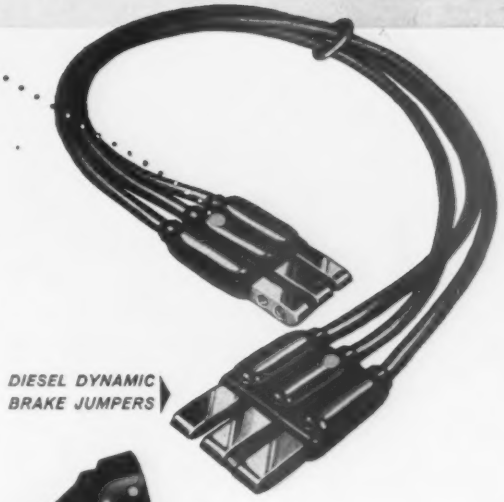
DYNAMIC BRAKE RECEPTACLES

JOY CONNECTORS for DIESEL EQUIPMENT!

Your confidence in JOY electrical connectors will never be betrayed! Carefully designed and manufactured to the highly specialized requirements of R.R. circuits, JOY plugs, jumpers and receptacles have been "working on the railroad" since '36. Factory molded as trim, rubber insulated/Neoprene jacketed units that are absolutely safe to handle even in dripping wet installations . . . they're shatter-proof, distortion-resistant and practically immune to damage by oils, grease, ozone and acids.

Complete details on JOY connectors for Diesel equipment as well as many other railway needs may be found in Bulletin # B64. If you haven't received your copy, or need extra copies . . . please fill out and mail the coupon below to:

JOY MANUFACTURING COMPANY
ELECTRICAL PRODUCTS DIVISION
1201 MACKLIND AVE., ST. LOUIS 10, MISSOURI

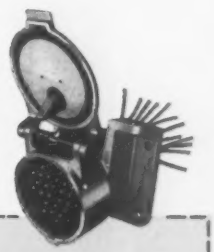


DIESEL DYNAMIC BRAKE JUMPERS

CONTROL JUMPERS

CONTROL RECEPTACLES

Note flexibility, illustrated by knot tied in cable.



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(Including Traction Motor Sleeves)	
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CD 150.1

Cast Steel
INCORPORATED DROP END UNITS

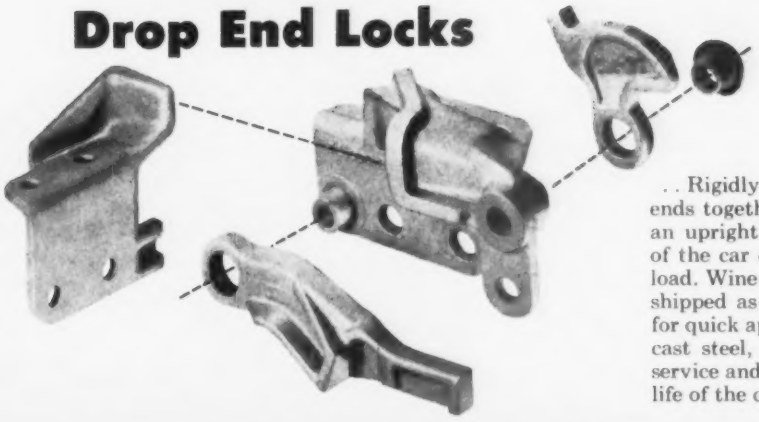
Speed

Inside view—showing top corner interlock and bottom corner hinge trunnion.

Service.. Sustain Structure

For outstanding economies . . . increased safety factors . . . improved strength and durability for the life of the car—Wine Drop End Units (Locks and Balancers) form *the perfect* combination!

WINE
Drop End Locks

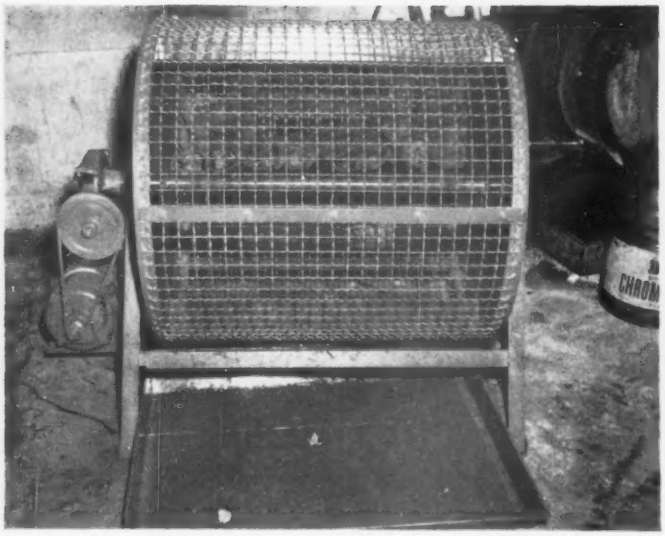


. . Rigidly interlock gondola sides and ends together—securing the ends in an upright position. Top corners of the car cannot spread regardless of load. Wine Drop End Locks are shipped as an assembled unit, ready for quick application. Made of electric cast steel, they insure maximum service and durability throughout the life of the car.

WINE
End Balancers

. . . Eliminate the necessity of using *four or five men* to close a drop end for car loading! Multiple spring steel torsion bars, incorporated between the center casting and the two outer hinge trunnion castings, permit *one man* to readily close the heaviest drop ends without assistance. Available for easy application on most drop end gondolas.

THE WINE RAILWAY
APPLIANCE COMPANY
TOLEDO 9, OHIO



Tumbler loaded with pads is ready for operation. Shelves extend toward center of circular cage to produce tumbling action.

Gaskets in this household washing machine were replaced with neoprene to withstand hot oil.

NP Pad Cleaner

(*Continued from page 32*)

A set of dirty lubricator pads are first placed in the tumbler for about 10 to 15 min. Two to four pads, depending on the size, then go in the agitator tub for 15 min. Hot car oil runs into the tub during the entire washing process. The rate of flow is adjusted to the capacity of the pump which keeps pumping the cooler oil back into the heating tank. In this manner, the temperature and level of the oil in the tub is maintained fairly constant.

After washing, two pads are placed in the spin-dryer portion of the tub for 2 to 3 min. The pads are removed, gaged, inspected and necessary repairs made. In the final operation, the pads are saturated with clean car oil. Approximately 40 gal of car oil in the system can be used to clean a large number of pads before it must be reclaimed or discarded. All types of pads can be reclaimed except those having metal parts.

Satisfied with the results obtained using the present device, the NP approached the American Laundry Machinery Company and suggested that its engineers develop a heavier duty machine that could be operated seven days per week, three shifts if necessary. American Laundry adapted a regular dry cleaning machine equipped with a washer and spinner. A method of heating the oil was added and changes were made in the pump and valves to handle heavier material. The machine has a capacity of 55 gal of oil, which can either be heated by steam or electrically with a 10-kw heater. It will take up to four pads at a time, with 10 min in the washer and 2 min in the spinner. The cleaning capacity is 600 lb per hour. At locations where three or four cars are serviced daily, the NP's present machine can be duplicated for about $350.

Wheel Flat Has Traveling Jib Crane

The Minneapolis & St. Louis took a 40-ft flat, spent $800 and converted it for transporting wheel sets (good and defective) between the shop and on-line points. The jib-crane, made entirely of scrap materials, can be moved the full length of car. It operates over the car end to place wheel sets on the rail or lift them off. The car is used at Albert Lea, Minn., and Mason City, Ft. Dodge, and Des Moines, Iowa, where there are no stationary cranes. Installing these would cost about $1,000 for each location.

M&StL's old method of wheel handling has become a two-man operation —one man on the car and one on the ground. There is a saving of four man-hours on every loading or unloading operation. The car was converted at Marshalltown, Iowa.

These switchers were death on brushes

...'til the road tried NATIONAL TRADE-MARK

M. HENIKA

The road switching locomotives of this railroad were breaking hundreds of brushes per month, says "National" Carbon Brush Man Morgan Henika.

Source of the trouble was severe vibration caused by widely varying operating conditions. Morgan recommended "National" brushes grade DE-3 for their special shock-resistant qualities.

RESULT: in the next twelve months, not one report of brush breakage.

Trouble-shooting is a specialty of "National" Carbon Brush Men serving the nation's railroads. The men's training, backed by National Carbon's *long term brush development,* make them your best consultants.

Call your "National" Carbon Brush Man or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

UNION CARBIDE

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ELECTRICAL SECTION

W. M. Keller, AAR
Praises Section

H. P. Wright, B&O
New Chairman

J. J. Schmidt, D&RGW
New Vice Chairman

C. R. Bland, C&O
1957-1958 Chairman

Ninth AAR Electrical Section Meeting . . .

Pacing Electrical Progress

DEVELOPMENT of new electrical devices for the rolling stock and fixed property of railroads was reported by many of the 18 committees presenting reports at the recent ninth annual meeting of the Electrical Section, Mechanical and Engineering Divisions, AAR.

Chairman C. R. Bland, C&O, opened the meeting by pointing to the growing demands upon railroad electrical departments, and asked members to urge more of the younger men to take an active part in Committee work. He said all departments are dependent upon electrical equipment and added that it was the personal obligation of electrical men to keep this fact before the eyes of management.

W. M. Keller, vice president — research, AAR, also spoke of this importance and referred to the motto "There is no progress without electric energy" which appeared over the speakers' table. He paraphrased it by adding, "There is no electric energy without electrical engineers." He then praised the group for its effective work and said that the AAR Research Center expected to give greater recognition to things electrical.

Just before adjournment, R. F. Dougherty, UP, proposed that the future work of committees should deal more with economics. He also suggested that the work of some committees should be consolidated. This would eliminate some formalities of procedure and allow more time on the floor when the Section is in session.

The Committee on Resolutions cited members of the Electrical Section staff for the great service they have rendered to the Section during the past year. It also cited A. G. Oehler, the electrical editor of *Railway Locomotives and Cars*, for his "unusual, competent and extremely agile reporting." This is rendered with a smile because the citation is given before the report is finished.

Committee of Direction of the Section is composed of (bottom row, left to right) J. J. Schmidt, D&RGW; H. P. Wright, B&O; C. R. Bland, C&O; S. B. Pennell, NYC; J. L. Christen, Pullman Co.; (top row, left to right) R. I. Fort, IC; R. H. Russell, GN; C. C. Elber, Secretary—Electrical Section; S. V. Smith, PRR; P. B. Burley, IC; and D. M. Burckett, B&M.

Election of Officers

Officers elected to serve during the coming year are Chairman: H. P. Wright, electrical engineer, B&O; Vice-Chairman: J. J. Schmidt, electrical research engineer, D&RGW. Members elected to the Committee of Direction were: H. L. Betts, chief electrical engineer, CNR, and R. A. Harrington, engineer train lighting, CMST P&P.

More A-C Equipment on Rolling Stock

The report on Car Electrical Equipment describes a variety of tests for Spicer clutches. Cost of the test equipment ranges from $1,000 to $10,000. It is suggested that if an inertia method of determining clutch is considered satisfactory, that costs may be considerably reduced and tests might be made under the car.

A new caboose power supply system, developed by Safety Industries, consists of a 1.5-kw, 14-volt, 108-amp inductor alternator, a rectifier panel and a voltage regulator panel. The report indicates it will operate with any drive which provides suitable operating speeds. The generator develops full load at 1,400 rpm and will operate at speeds up to 7,000 rpm. Rectifier temperature is used to limit generator output current.

A method for capacity rating of storage batteries in passenger car service has been prepared to provide uniform and completely comparable results. It covers ampere-hour and kilowatt-hour capacity, voltage limits, and specific gravity at specified temperatures. Information covering capacity tests and data plate requirements are also covered as are cable requirements for inter-tray connectors.

Lead-calcium batteries have been under test by 10 railroads since 1953. Twenty-four batteries were tested on diesel-electric locomotives, commuter cars, head-end and passenger cars and in sub-station control service. The most distinguishing characteristic of the lead-calcium battery shown by the tests is that it requires from one-half to one eighteenth as much water for flushing. Most of the users desire more experience before endeavoring to evaluate other characteristics of this type of battery.

In presentng the report, R. H. Russell, GN, said that the Pullman Company is developing a means of blocking clutch weights which may permit testing of clutches without the need for disassembly. R. I. Fort, IC, said all forms of dynamic testing are expensive and asked if inertia testing were satisfactory. H. Clark, Davo Manufacturing Corporation, reported that his company will run inertia tests to see if it is.

A discussion of battery powered car marker lights indicated they may prove satisfactory. The light, which is of high brilliance, is a flashing light wth an "on" perod of such short duraton that battery drain is small.

Mr. Fort described a new method of supplying parked Pullman cars with power. It consists of two paralleled rotary converters mounted in a baggage car. A GP9 diesel operating in the third notch supplies the power, and the rotaries furnish 375 kva of 220-volt, three-phase a-c power to the cars. As much as 500 kva of power may be supplied with the engine operating in the fifth notch.

Air Conditioning and Refrigeration

Mechanical refrigerator car temperature controls first covered in the 1957 report, were again studied in 1958. Among the three new types of control, is an improved Vapor unit in which there are two stages of cooling with a minimum interval of 1½ deg F.

Another is a Penn control which uses a liquid-filled spiral sensing element connected to the panel by a 96-in. capillary tube. As the car temperature changes, the liquid expands or contracts and the resultant motion

R. H. Russell, GN

E. H. Brown, PRR

is transmitted through a mechanical linkage to operate a set of sensitive contacts which in turn control the pilot relays.

Another Penn control incorporates a magnetic amplifier to provide a closer control of temperature than can be obtained with the capillary tube type of control.

A comprehensive study of passenger car heating has been made. A well-insulated passenger car will use from 230 to 350 lb of steam per car per hour at ambient temperatures of 0 to 31 deg F. A 2-in. train line cannot heat more than 12 to 14 cars, and a 2½-in. line will heat 16 to 20 cars satisfactorily. Steam heat, waste-product heat, three types of electric heat and reverse-cycle heating are described in the report with illustrations.

"This study", the report states "indicates that all methods of electric heat, including the reverse-cycle heating system, for an individual non-electric passenger car require the use of an additional axle-driven motor-generator. Although the maintenance cost of these systems may be less and the usual difficulties encountered with steam trainlines are eliminated, electric heating would not be economical as it would require additional tractive force from the diesel-electric or electric locomotive, when maximum tractive force is needed during the winter season. This would result in the use of additional locomotive power or the reduction in the number of cars in the train.

The waste heating system from diesel engine-alternator power plant is the only system other than steam that does not require additional tractive force to generate the electric power required. Although the troubles encountered with steam heating apparatus and steam trainlines are eliminated, the overall cost of equipment and maintenance would probably be greater."

A report on the performance of high-speed air conditioning compressors shows that they developed some wear and troubles not common to the slow speed type. Some of these, however, have been due to incorrect operating and maintenance practices and others have been corrected by improvements in design. The report states that there is a definite need for an educational program designed to improve maintenance of the unloader type high-speed compressor, particularly in the diagnosis of compressor failures.

On the favorable side of the high-speed compressor are its compactness, and size and weight in relation to capacity. These features make possible the elimination of pulleys, belts, and tension devices, permitting the use of motors of standard speeds, directly connected to the compressors. Another item is the near-absence of any trouble with the coupling between compressor and motor.

The present trend in the refrigeration industry is very definitely to high-speed compressors. It is estimated at this time that 90 to 95 per cent of all compressors being applied to railroad cars are of the high-speed type. Further development by the supplier is necessary to reduce the present overall maintenance of this type.

Open type compressors for food refrigeration on passenger cars and the d-c motors for their operation are becoming unavailable. This is requiring the use of hermetically sealed a-c units. These are smaller, require less maintenance, and cost less than open type units. However, if conversion equipment is required, the overall cost is greater. Conversion equipment must have considerable excess capacity to allow for starting current requirements.

The report was presented by J. J. Schmidt, D&RGW. A. Padfield, PRR, pointed out that, of all heat sources, steam heat is the most economical. R. H. Russell suggested that, since it is necessary to use under-car power plants when there is no need for air conditioning, it might be desirable to use them to supply a part of the heating load with electric heat. In discussing the section on condenser cleaning, J. L. Christen, Pullman Company, said that a compound called Steamright No. 14 had proved to be highly satisfactory for some types of condensers.

Mr. Schmidt reported that R. L. Brittin, IC, was developing a device for determining the capacity of car air-conditioning systems. In answer to a question on costs, Mr. Brittin said it was made largely of standard parts and should not be too expensive. Mr. Schmidt referred to a letter prepared by Secretary C. C. Elber showing how such developments may be brought to the attention of the AAR Research Laboratory.

Welding and Cutting

The flame hardening of coupler ball point housings was attempted unsuccessfully in 1956. It was then not found possible to keep the housing from contracting, causing the joint to bind. Sixteen housings have now been flame hardened with no distortion. The operators are to develop the method further. Another new application of welding which has proved successful is the repair of Baldwin-Lima-Hamilton aluminum chain drive housings. It is done by means of the Heliarc process. In presenting the report, H. P. Wright, B&O, indicated the need for much more work in the field of welding and cutting. It was moved that the secretary write a letter for the association to L. E. Grant, CMStP&P, recognizing the great amount of valuable material on welding which he has incorporated in reports during many years in the past.

Improving Locomotive Components

Material prepared by the Committee on Automotive and Electric Rolling Stock for inclusion in the Manual, includes standardized dimensions and contact identification of 27-point control plugs and receptacles. Also included are typical procedures for power testing, sequence testing and testing of transition on diesel electric locomotives.

Also prepared for inclusion in the manual are mounting locations for 27-point control receptacles and brake field loop receptacles

(*Continued on page 42*)

Pennsylvania Railroad...

. . . Joins

Chicago & North Western Railway

Hudson & Manhattan Railroad Co.

Boston Metropolitan Transit Authority

Cleveland Transit System

Three of the new Pennsylvania Pioneer Commuter Cars are equipped with Westinghouse Air Brake Tread Brake Units and Cobra Shoes.

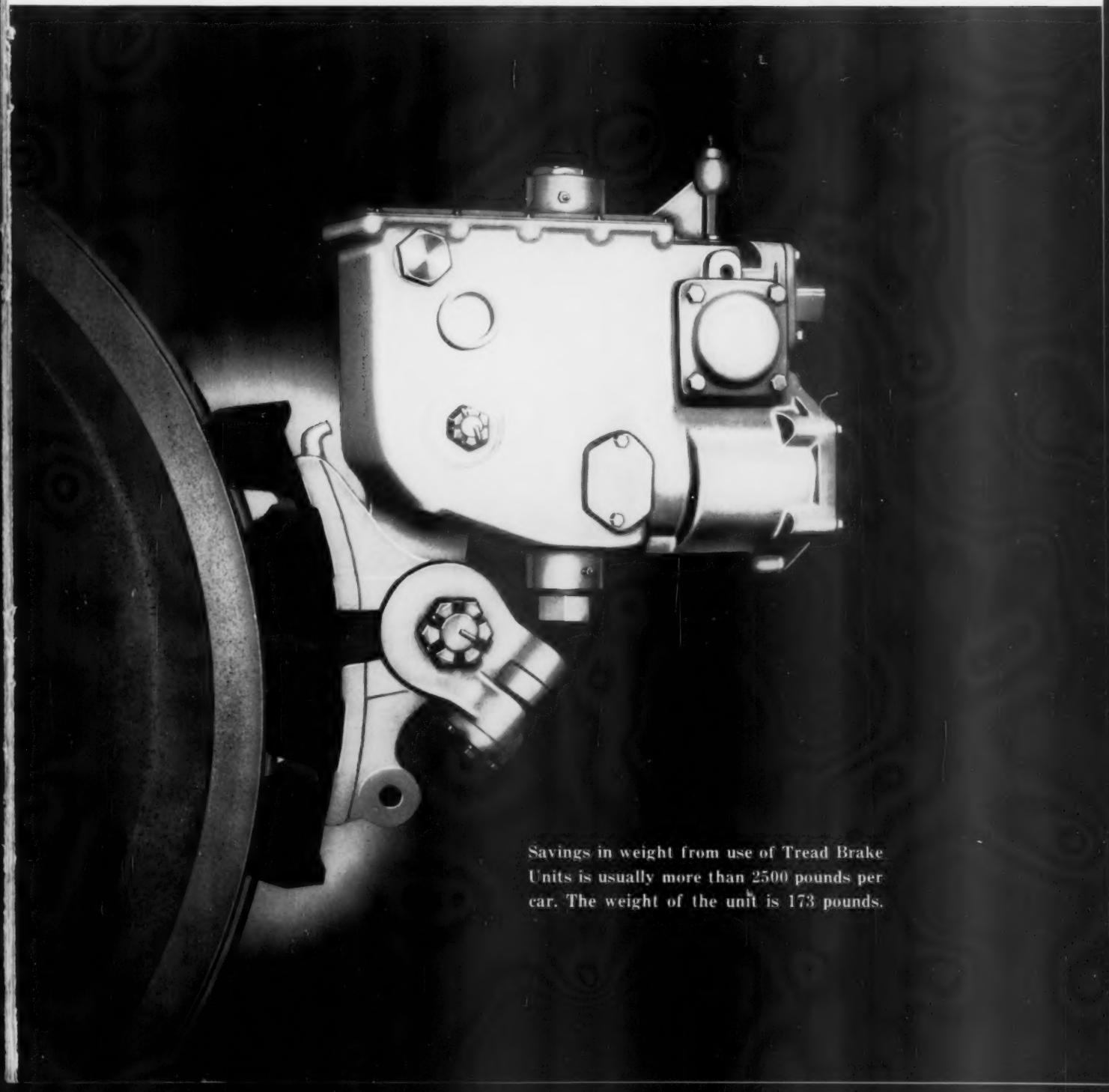
The Tread Brake Unit provides complete braking power with but one Cobra Shoe per wheel.

A total of 1600 of these units are now in service on the properties listed above.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PA.

installs

Tread Brake Units and Cobra Shoes on New Commuter Cars



Savings in weight from use of Tread Brake Units is usually more than 2500 pounds per car. The weight of the unit is 173 pounds.

P. O. Lautz, AT&SF

B. P. Burley, IC

C. W. Martin, B&O

F. J. Corporon, CSS&SB

L. B. Curtis, PRR

L. W. Birch, Ohio Brass

on the ends of hood-type locomotives equipped for multiple-unit operations.

A train resistance formula, included in the report, is offered as being more closely in keeping with facts than the Davis formula.

The desirability of replacing fuses and fusetrons with circuit breakers is discussed. It is suggested that all locomotive builders should provide mounting space for the largest type of comparable capacity circuit breaker manufactured, and likewise the manufacturers of circuit breakers should provide plates to adapt their breakers to these mountings.

E. H. Brown, PRR, presented the report. Much of the discussion concerned permanently attached train-line jumpers, one end of the jumper being wired to the car and the other terminated by a receptacle. Mr. Fort said that such jumpers might be applied to locomotives and that they have definite advantages. Mr. Brown said the idea is not new and that it involves some difficulty in maintenance. Mr. Fort said the plug may be placed in its own receptacle when not in use and that the application does not involve a dangling receptacle. It is necessary that the jumper be somewhat longer. In reply to a question about testing dynamic brakes, R. F. Stacy, Fairbanks-Morse, said the subject should be studied to develop a satisfactory procedure for dispatchment check.

Locomotive Facilities and Procedures

The former Committee on Repair Shops, now called the Committee on Electric and Diesel-Electric Locomotive Facilities and Procedures, has listed factors influencing facilities for the maintenance of diesel locomotives.

Reference is made in the report to a jumper testing stand described in a previous report. This stand attempted to determine the condition of jumper conductors by measuring resistance. This has proved to be unsatisfactory because of variations in contact resistance.

The report then states that the high-current type test stand is presently the accepted method on many railroads to test jumper cables. Construction details of stands vary from railroad to railroad but results are much the same.

The high-current test is a go or no-go test and determines if a cable has continuity and will carry a certain current. Current values vary. Approximately 60 amp will, in about one minute and 20 seconds, burn open 15 strands of No. 34 AWG wire while it is being agitated. Results from the use of high current testing have been encouraging. Faulty cables have been detected. One railroad reports that at one location no cable tested on the current stand has failed in service.

P. O. Lautz, AT&SF, presented the report. Mr. Fort said: "The report gives extraordinary attention to detail, covering points influencing maintenance that I didn't even know about. It is," he added, "a monumental work, and I admire the precision and care that has gone into its preparation." Mr. Stacy reported that F-M service men consider it a most desirable procedure for overhauling equipment. He added that F-M fuel pumps should be maintained by the manufacturer. P. J. Sasgen, PRR, said that the committee will consult with manufacturers when pump specifications are written.

Radio on Rolling Stock

The committee reports that within the last few months radiotelephone sets with a 64-volt, d-c transistor type power supply as an integral part of the transmitter-receiver package have been placed in service on several railroads. There are no moving parts or electron tubes in this type power supply. It has a conversion efficiency equal to or better than devices using moving parts in the same service, and preliminary indications are that maintenance expense will be negligible. It requires 1.4 to 2.2 amp when the radio is in standby condition and three to four amperes when the transmitter is in use. These current values hold true for supply voltages from about 64 volts to 85 volts.

The report was presented by P. B. Burley, IC. Mr. Fort explained how it is possible to have very high voltage peaks in battery-operated transistor transmitters, when the battery field contactor is open. These are apt to be destructive to transistors but he said the hazard may be eliminated by the application of shunting condensers.

Mr. Schmidt asked if there is a device being developed to replace vibrators and Mr. Burley replied that there will be such a device for the three-unit type of equipment.

Wiring Diagrams

The work of the Committee on Wiring Diagrams is doing much to reduce confusion and to reduce the amount of work done by railroad drafting rooms. This year's report, which is Chapter 9, is listed as "Specification for Connection Diagrams." It is presented as information, and for future manual material when the chapter is completed.

C. W. Martin presented the report. He said the AIEE Land Transportation Committee is adopting Electrical Section recommendations and passing them to the American Standards Association for all forms of transportation equipment. C. W. Roth, EMD, reported that Electrical Section wiring diagrams were endorsed by the Electro-Motive Division. A similar statement was made by H. S. Ogden, General Electric.

Section Sees Railroad Electrification

Six Budd "Pioneer III" type, mercury-arc rectifier m-u cars, delivered to the Pennsylvania, and a control arrangement developed on the Milwaukee which permits operating electric and diesel-electric locomotives in multiple were mentioned in the report on Railway Electrification.

Anticipating the return of electrification to American railroads at some future time, the Committee on Railway Electrification is organizing its work to anticipate this. The assignments make it apparent that catenary power at high voltage and commercial frequency is expected.

During 1957, there was much development of electrification in foreign countries, but none on the North American continent. Most of the new developments are employing commercial frequency, 50 cycles at 25,000 volts using rectifier types of cars and locomotives.

The report gives consideration to the apparent needs of matching a new system with an existing one. The problems associated with signal and communication systems are being given consideration to avoid conflict and unnecessary installation expense.

Characteristics of American catenary systems are tabulated and charted. Statistics on electrification systems throughout the world have been compiled and included in the report. These show route miles, track miles, voltage and system.

The final section of the report consists of a review of the desirability and possibility of developing up-to-date schedules of fees for the occupancy of railroad right-of-way by electric and communication companies.

The report was presented by L. B. Curtis, PRR. Mr. Fort wanted to know if the committee had followed European developments of pantagraphs and carbon contacts and was told they are under study.

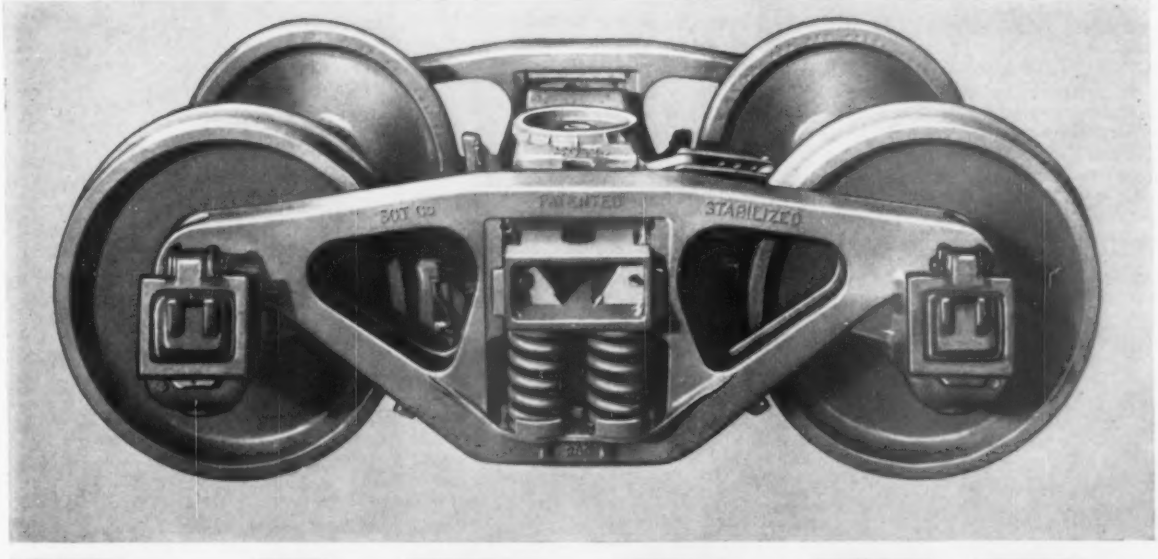
There has long been a question concerning distortion in power line distribution which might be caused by railway electrification. E. B. Shew, Philadelphia Electric Co., said that in the case of large power systems, tests indicate that single phase unbalanced load such as might be caused by electrification do not present difficulty.

R. M. Stacey, Fairbanks-Morse said his company has been asked to quote on an 11,000 volt electric-diesel-electric locomotive. Such a machine he said may be built in a compact package and might be used in a transition period changing from diesel-electric to electric.

H. F. Brown, Gibbs & Hill, presented a report on electrification. He said all fuel costs have about doubled in the past 16 years

(*Continued on page 44*)

Experienced Car Builders BEGIN WITH



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Standard Car Truck Company, 332 South Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Montreal 2, Quebec.

H. F. Brown, G&H

J. Stair, Jr., G&H

E. M. Hastings, C&O

H. C. Cross, B&O

R. C. Welsh, PRR

F. T. Snider, PRR

while the cost of electric power has remained almost constant because of increasing efficiency of production and distribution. Future cost of electric power he said will increase but not at as high a rate as for fuel. Large power networks soon to be available in the Eastern section of the country will make possible electrification of railroads to prove this economy.

L. W. Birch, Ohio Brass, extended another report on electrification which he presented to the Section last year. It describes new electric developments in foreign countries. These included the adoption of high voltage commercial frequency systems, relative cost of electric energy to liquid fuel, lightweight distribution systems, nuclear power, dual systems and phase unbalance. He stressed particularly the importance of giving attention to signal and communication systems in advance of an electrification which might require inductive coordination.

J. Stair, Jr., Gibbs & Hill, described coordinating work being done by the Committee on Land Transportation, American Institute of Electrical Engineers. This committee is working with the Electrical Section Committee on Wiring Diagrams. Mr. Stair referred to the conflict of AIEE meetings in Buffalo during the Electrical Section Convention. He pointed to the desirability of avoiding such conflicts where possible.

Relations With Public Utilities

In 1954, the Committee on Relations with Public Utilities wrote a report on the relative cost of transmitting power by rail in the form of coal and compared with sending it as electrical power by wire. At that time, it was figured that on the average, the cost by wire was greater if the distance was more than 230 miles.

This year's report is in the nature of a re-evaluation of the 1954 report. Increased utility plant size, better load factor, and efficiency have pushed the balancing distance up. It is also pointed out that the development of nuclear energy will apparently be slower than at first anticipated: oil and gas available at a competitive price will diminish, and coal will be carrying the greater part of the burden at least until 1975. More electric plants will reduce average distances of transmission.

E. M. Hastings, Jr., presented the report. He referred to the statement in last year's report that 230 miles was the balancing distance for comparing the cost of coal with that of transmitting electrical energy. This distance he said is increasing in favor of electrical transmission and roads must be alert if they are to maintain a competitive position. This is particularly important because many railroads depend heavily on their coal traffic.

New Standards Are Adopted

The greater part of the report of the Committee on Electric Heating consists of specifications for electric heaters for ballast under track switches, for the installation of tubular type electric heaters for track switches and for tubular type electric heaters for track switches.

New information for ground protection systems for track switch heater installations is included. It is based on the fact that 200 ohms connected between the rails will not shunt the typical signal system. Thus, if two 100-ohm resisters are connected in series between the rails and the center point solidly grounded, a ground point is established with respect to both rails. It is then possible to connect a ground relay between the power system neutral and ground, and use it to detect grounds to the running rails. A protection system based on this principle is described in the report.

Mention is made of the use of electric radiant panels for thawing frozen iron ore in cars at Two Harbors, Minn. Results indicate substantial savings. A new and effective means of drying traction motors in place has been developed on the New York Central. J. J. Gregory, assistant to the general mechanical superintendent, locomotives, and R. L. Henderson of General Electric's Lamp Department, developed a compact dryer unit, which was fabricated by M. Chandler, assistant general foreman at the New York Central's Collinwood yards, Cleveland.

The dryer, equipped with three 120-volt, 500-watt quartz lamps and a 150-cfm blower with an adjustable air intake, is adaptable for mounting on all freight and passenger traction motors. It is designed so that all that must be done to place it in operation is to remove the top inspection cover on the motor and place the unit over the opening. It is not necessary to remove the motor from the engine, making it a valuable time-saving tool for all running maintenance shops.

Tests indicate that drying time will vary between one and six hours, depending on the amount of moisture present.

The report was presented by H. C. Cross, B&O. In response to a question, M. H. Work, NYC, reported that the use of the 200-ohm resistance across the track circuit shown in one of the diagrams in the report does not affect operation of the track circuit. It was also pointed out that symbols shown in the wiring diagram do not conform with Electrical Section standards, and it was moved that they be changed to conform.

With reference to the drying of moisture from grounded traction motors by means of infrared quartz lamps, Mr. Henderson said that radiant energy is absorbed by the commutator bars and transmitted to the coils. The blower, he said, takes off surface heat so that the method cures from the inside as well as the outside.

Power Supply

Specifications for standby power plugs have been prepared by the Committee on Power Supply for inclusion in the Manual.

Rechargeable flashlight batteries have largely lost the interest of railway users in this country because of cost and difficulty in charging and servicing. The result is they are no longer made by American manufacturers. New interest by the committee members has been created by a selfcontained rechargeable flashlight of German make. It contains its own battery and charging rectifier, and is fitted with a standard attachment plug under the rear cap so that it may be plugged into any standard 60-cycle, 110-volt a-c outlet. Battery capacity is such as to make committee members feel that the subject of rechargeable batteries is not dead.

The report was presented by R. C. Welsh, Jr., PRR. J. L. Christen asked if some form of lubricant, such as plating, is used in the manufacture of stand-by plugs to reduce resistance in meshing. A. E. Ganzert, Pyle National, said that rhodium plating may be included for an additional cost of about one dollar and that it is well worth the cost.

Referring to the flashlight with a chargeable battery and self-contained rectifier mentioned in the report, R. L. Henderson, General Electric, said it was important that a potential buyer of such devices learn if he can buy parts, or if replacements may be made with standard connectors.

Wire, Cable and Insulating Materials

AAR specifications for insulated wire have been shown in parallel columns with equivalent national specifications in the report of the Committee on Wire, Cable and Insulating Material and offered as manual material. The report also includes specifications for polyvinyl tape. These are offered as information.

The committee reports that during 1957 the ASA adopted Specification C8, 35-1957—American Standard Specification for Weather Resistant Wire and Cable-Polyethylene Type.

After January 1, 1958, the color green was used exclusively for ground in all portable cords.

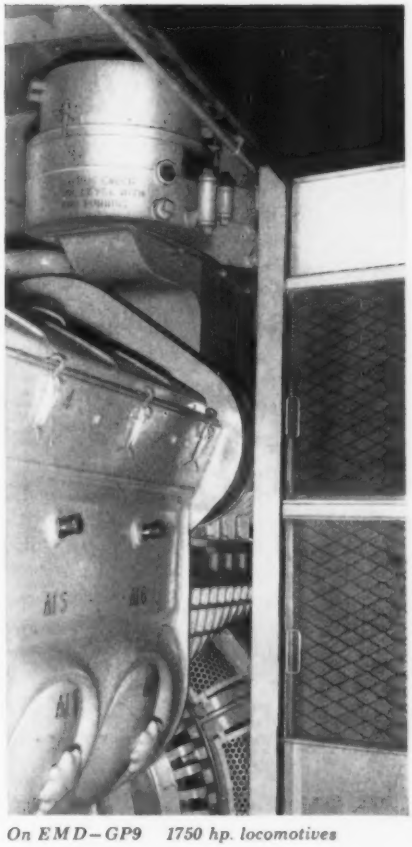
Because it is highly thermal plastic, the report states that wire with polyvinyl chloride insulation should not be used for locomotive wiring.

In presenting the report, F. T. Snider,

(*Continued on page 46*)

HOW TO INSURE LONGER ENGINE LIFE

for less cost than it takes to overhaul 2 or 3 power assemblies



On EMD–GP9 1750 hp. locomotives

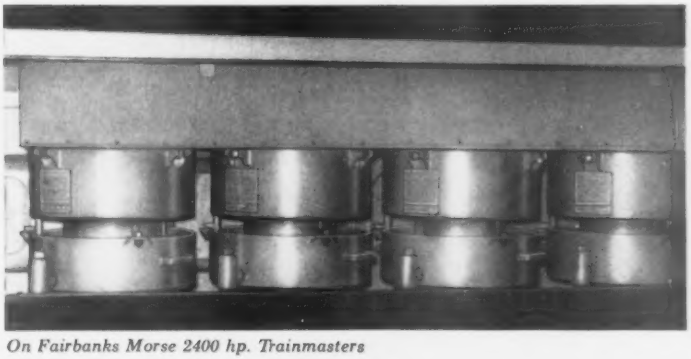
These installations show how over 100 leading railroads save money on maintenance of diesel locomotive engines.

By using Air-Maze oil bath filters they remove up to 97% of all objectionable dirt from intake air.

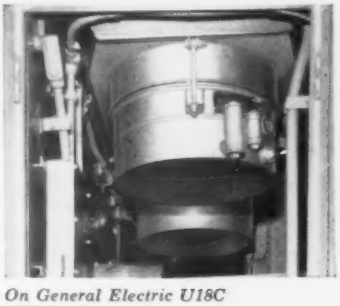
According to test reports, piston ring and cylinder liner wear are reduced 50 to 75%.

Maintenance is negligible since the Air-Maze oil bath filters go as much as a year with no attention except for periodic checking of oil level.

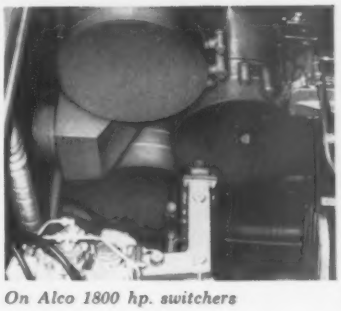
Contact your locomotive builder or write us for details. The Air-Maze Corporation, Cleveland 28, Ohio. Dept. RL-8.



On Fairbanks Morse 2400 hp. Trainmasters



On General Electric U18C 1980 hp. locomotives



On Alco 1800 hp. switchers

The biggest names in diesels are protected by Air-Maze filters

ENGINE CAR FILTERS
CAR BODY FILTERS

AIR-MAZE
The Filter Engineers

LUBE OIL FILTERS
PASSENGER CAR FILTERS

BEFORE new lighting was installed, illumination intensity in New York Central's Ashtabula, Ohio, shop was between 2 and 20 footcandles.

AFTER fluorescent fixtures were installed, light level went to 60 footcandles and machines no longer required individual light fixtures.

PRR, detailed specifications for the Manual. Mr. Martin asked: "Will we ever have a report on pressure type terminals?" Mr. Snider said that would be very difficult and it may be necessary to list methods of application developed by the several manufacturers.

Illumination

In recent years much attention has been given to the lighting of large yards. The report calls attention to overlooked conditions in small yards which frequently involve greater hazards than those in the large yards. It recommends that attention be given to the applicability of mercury vapor street lighting luminaires along the switching lead tracks.

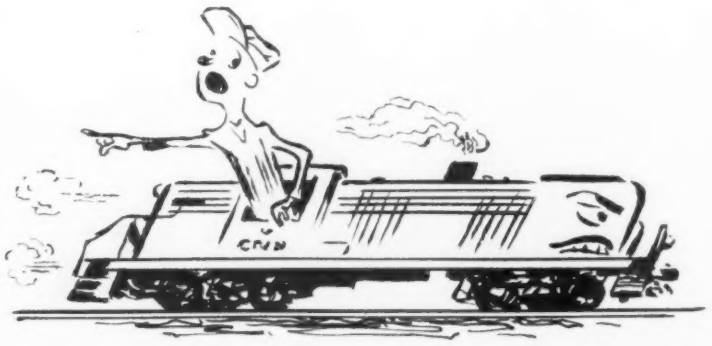
As a part of its recent relighting program, the New York Central relighted its scrap and reclamation shop at Ashtabula, Ohio. Incandescent RLM fixtures were replaced with continuous rows of two-lamp fluorescent fixtures and illumination intensities were raised from values between 2 and 20, to 60 footcandles.

A black light inspection unit developed on the Baltimore & Ohio makes it possible to detect fuel leaks and to distinguish between fuel oil and lubricating oil. A fluorescent dye added to fuel oil being pumped through the system causes leaking oil to appear in brilliant color under the black light.

From the Diesel Maintainer's Note Book

The Perverse Reverser

B. A. Striver



STRANGE THINGS can happen in a diesel locomotive control circuit when grounds develop. Recently, the reverser of an Alco road switcher would stay only in the *Forward* position.

This condition first developed at an outlying point. It was decided to disconnect the reverser control air pipe from the air manifold, and bring the locomotive to her home terminal by operating the reverser manually. A wood peg was used to plug the manifold.

A check of control circuits showed a full positive ground on the fuel pump circuit which includes the fan control panel and its circuit. A bare wire was found resting against the fan control switch bracket. When this was cleared, the reverser again operated normally.

While it was known that there were other grounds on the control circuits, no apparent difficulties resulted. A shortage of locomotives made it necessary to put this one back in service immediately.

About a week later, the reverser again began to stay in the *Forward* position. Now, in addition to this, the *CVS* speed relay came in at first throttle position. It should be energized from third to eighth throttle notches only. There were also indications that the remote control of the steam trainline cut-off was involved.

The most likely place for the No. *8* wire to the *Forward* coil of the reverser magnet and the No. *7* wire of the positive side of the *CVS* coil to be shorted or grounded would be at the terminal strip for the m-u receptacles in a box under the back platform of the locomotive. It was found that there was an almost full ground on the batteries which had to be cleared before control circuit grounds could be checked. The batteries were washed and dried with rags.

The deck plate and cover of the terminal strip box were removed and an accumulation of rust and moisture was found. The terminal strips were in poor condition and it was decided to remove the wires from the strips and splice them through. This reduced the control ground, and cleared up the difficulty.

NEW THEW-LORAIN

"Square Tubular-Chord" Crane Boom

The Moto-crane, designed and built by The Thew Shovel Company of Lorain, Ohio, offers a uniquely light, powerful, maneuverable boom. Completely fabricated of Shelby Seamless Mechanical Tubing, the boom consists of four main chords of square tubular construction, reinforced by lacing of round tubing. In sizes, the main chords range from 2″ x 2″ x .189″ wall to 4″ x 4″ x .250″ wall.

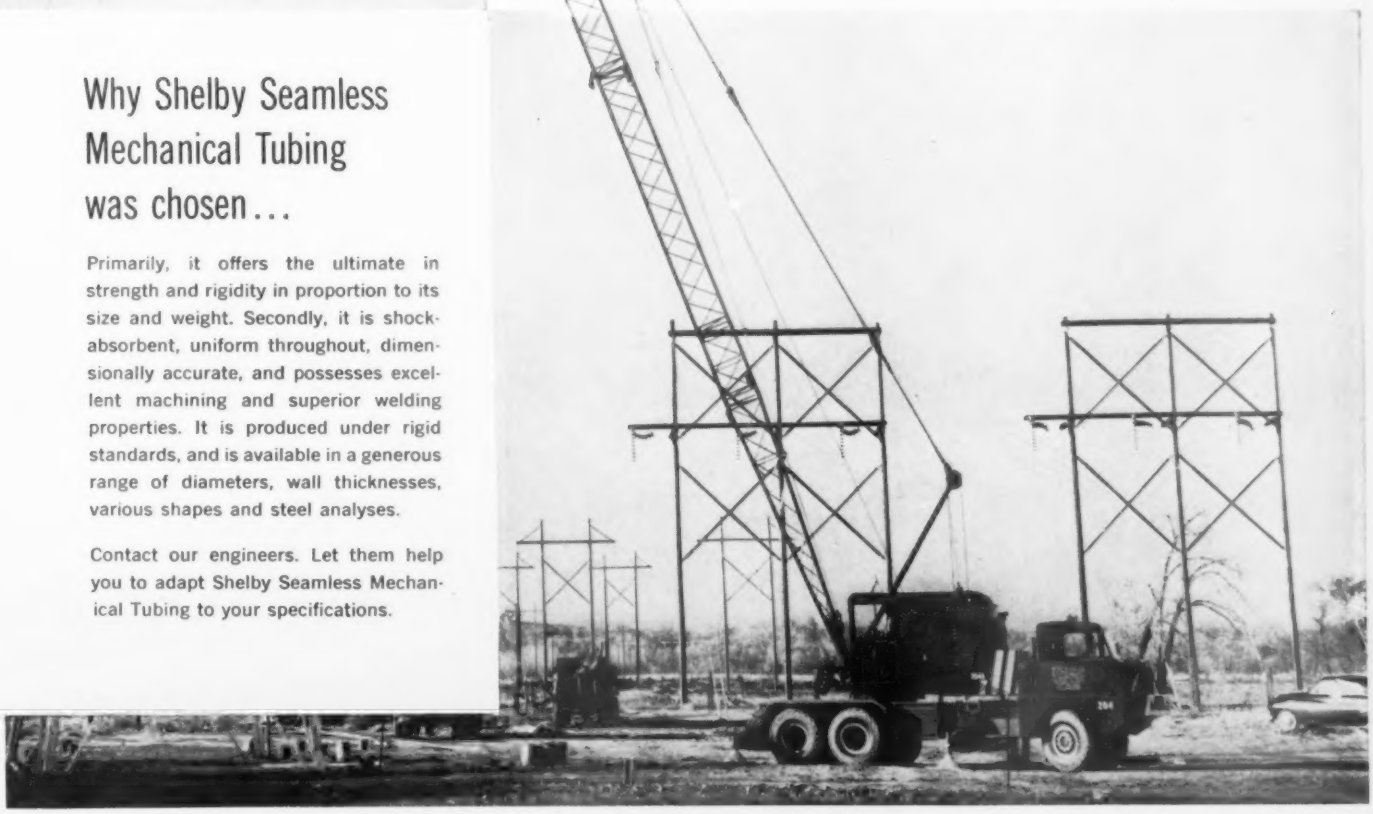
The advantages of this type of construction are manifold. The square cross section of the four main chord members gives the greatest radius of gyration for column strength, 15% better than round members, 90% better than angles. This radius is the factor that gives square chord sections the greatest column strength per lineal foot of weight. The result is a weight savings of 20 to 30%, greater strength, and increased lifting capacity. It also permits handling and traveling with longer booms.

USS and Shelby are trademarks

Why Shelby Seamless Mechanical Tubing was chosen...

Primarily, it offers the ultimate in strength and rigidity in proportion to its size and weight. Secondly, it is shock-absorbent, uniform throughout, dimensionally accurate, and possesses excellent machining and superior welding properties. It is produced under rigid standards, and is available in a generous range of diameters, wall thicknesses, various shapes and steel analyses.

Contact our engineers. Let them help you to adapt Shelby Seamless Mechanical Tubing to your specifications.



The 35TM Moto-crane unit with straight 105-foot boom and a 20-foot tip extension. Some of these booms have been as long as 200 feet.

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Supply Division • United States Steel Export Company, New York

9 Roll Them Out Like New

Armature Inspection and Test

WHEN THE ARMATURE is out of the frame, its general condition should be checked. Obvious signs of trouble—thrown solder, burned commutator bars, deep holes burned into the windings, serious loosening of the bands, or mechanical damage—are easily detected. Some armatures may be so bad that preliminary inspection shows they must be rewound. Others, which look all right, will need further checking. The troubles, their visible symptoms, and reactions to standard tests must be understood.

INSULATION RESISTANCE TEST. A glance at the "as received" record, plus an insulation resistance test, will show whether the armature can stand "hi-potting." If the armature is dry and its resistance is below a specified value (usually 15 to 20 megohms), cleaning is necessary. If, after cleaning, baking and cooling, the value is 100 megohms or higher, the armature may be "hi-potted" and treated in varnish.

HIGH POTENTIAL TESTS. Too much cannot be said about the dangers of putting high potential on a winding having low insulation resistance. Many machines that have broken down in "hi-pot" could have been saved if they had been thoroughly cleaned before testing. Machines not thoroughly cleaned may break down before the prescribed voltage is attained, or before it has been held for the required length of time. When this happens to a machine which appears to be clean, the trouble may be caused by an accumulation of carbon dust, oil or other contamination on the creepage surfaces that are hard to reach.

A good rule is to strive for perfection in cleaning. With proper equipment and know-how, it is usually possible to bring the insulation resistance up to infinity. However, it's not enough to get infinite resistance under dry shop conditions. There may still be dirt in those hard-to-reach pockets that will cause trouble when it gets damp.

To prove this, take a small spray gun or atomizer and spray water into some of those dull looking spots. If the insulation resistance drops sharply, dirt is present. Do the same on new, well-varnished insulation, and note how the resistance holds up. This shows why you can get a high megger reading, even with dirt present—provided it is dry. Although such a machine may pass the regular hipot test, this doesn't mean that it will stand up under adverse service conditions. Above all, you don't want to varnish over this dirt—that would only make matters worse.

Some shops prefer the newer d-c high-potential testing sets to the standard a-c 60-cycle testers. Others are still investi-

(*Continued on page 50*)

This is the ninth article in the series covering heavy maintenance of locomotive electrical equipment.

Part 9 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

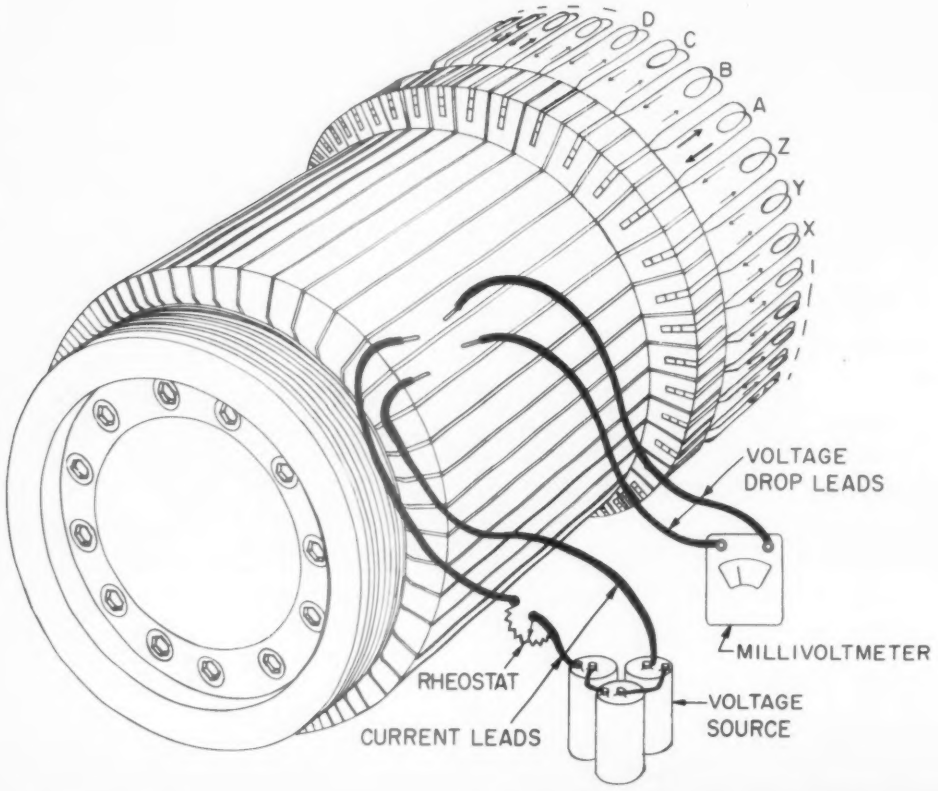
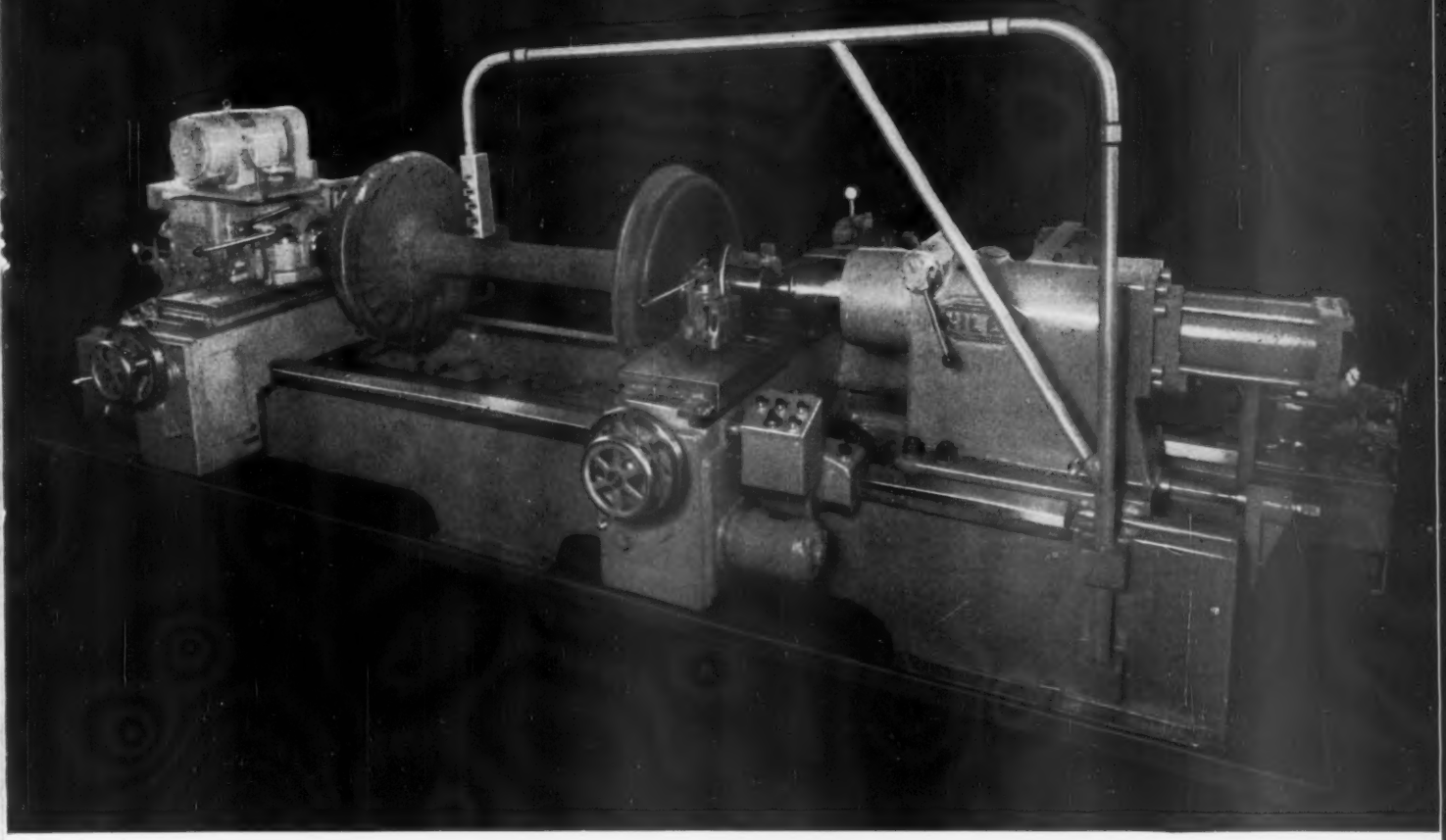


Fig. 1—Bar-to-bar resistance test locates high resistance joints.

NEW FROM NILES



All-purpose Niles journal turning and hydraulic burnishing lathe

To the world's most complete line of railroad machine shop tools, Niles has now added a new end-drive axle journal turning and burnishing lathe. All-purpose in every respect, this new lathe can accommodate—with equal facility and economy—new and used A.A.R. car wheel sets or axles, diesel axles, or diesel locomotive wheel sets with drive gear attached.

One of its many new features is the hydraulic power activated burnishing rolls on which pressure is automatically equalized. It is possible to turn or burnish inner bearings up to a maximum axle length of 13'-½" long without reversing the wheel set. For the maximum in railroad shop efficiency, write Dept. 9H for details and descriptive technical data on this new railroad tool.

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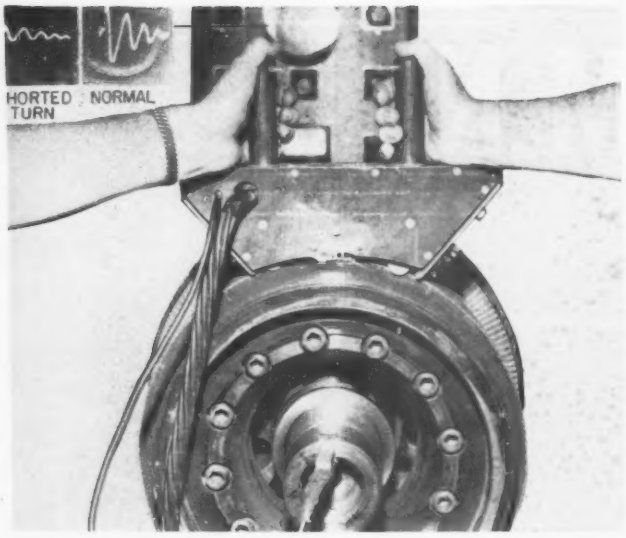


Fig. 2—Surge comparison testing equipment, and its typical oscilloscope screen patterns detect faults not found in measuring bar-to-bar resistance.

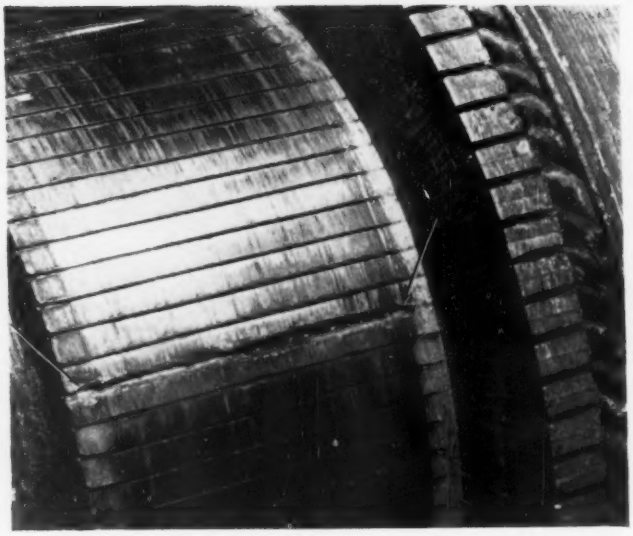


Fig. 3—Commutator burning resulting from an open-circuited armature coil produces this trench.

gating the merits of d-c testing. One significant advantage is its ability to indicate the condition of the insulation by means of the leakage current characteristic. This permits the test to be stopped before breakdown occurs, avoiding unnecessary repairs. One point still in question is the relation of d-c to a-c test voltages. A value of about 1.6 times the a-c value is a widely used compromise. After a d-c hipot an electric charge remains in the machine. This should be drained off by connecting the commutator to ground.

Bar-to-Bar Resistance Test

The bar-to-bar resistance test is used as a check for high-resistance connections and open or short circuits in the armature winding. Various forms of equipment are used. The principle on which they work is sketched in Fig. 1. Two leads carry current from a battery to the commutator. A small rheostat is used to adjust the current to a suitable value. Another pair of leads is connected to a millivoltmeter. When these are touched to a pair of adjacent bars, the resistance of the connected armature coil is indicated by the meter reading. In this test, current passes through coil A and back to the battery in Fig. 1. A parallel path normally exists through all the other coils (*B, C, ... Y,* Z) in series. This circuit has many times the resistance of coil *A*, so it carries very little current. Unless the circuit through coil *A* is open, it carries about 99 per cent of the current.

The meter indicates the resistance of this coil and its connections. A more elaborate equipment, called a comparator, is sometimes used where the volume of work is high. It consists of a tester and a device for making contact with a pair of adjacent commutator bars. The tester contains a battery and rheostat, and a sensitive light-beam galvanometer. A pair of fingers in the contact device is connected to the power supply, and another pair to the galvanometer.

By taking readings around the commutator it is possible to compare the resistances of all the coils. The rheostat should be set to give a reading near the mid-point of the meter scale. This will be about the same for all good coils. If it jumps up scale 5 per cent or more on a pair of bars, there is likely a poor connection in one of the leads.

The spot should be marked for repair. High resistance joints may sometimes give off-scale readings. Don't hold contact longer than necessary to note the off-scale reading or the meter may be damaged. Low readings are rare, but if encountered they indicate a short-circuited coil. The spot should also be marked for repair.

This test can detect insulation faults not discernible with the bar-to-bar resistance test because it applies a much higher voltage. A peak of about 500 volts a-c can be applied between adjacent bars. The "surge" pattern is indicated on an oscilloscope screen, Fig. 2, when the voltage is applied. The operator checks by comparison all around the commutator, watching the scope pattern. If a fault is indicated, the pattern will collapse as shown in Fig. 2.

This test also indicates any short circuit between commutator bars. Normal dirt in the mica slots shows up as sparking on the commutator. Carbon dust, dirt or copper particles should be cleaned out before testing.

The surge test applies several hundred volts between adjacent bars. Therefore the equipment is specially designed to protect users. The electrodes are mounted in a yoke having two handles fitted with safety grips. The operator must close these before the circuit is complete and voltage is applied. In general, use the same precautions when making this test as when using any high-potential equipment. Be careful not to let any part of the body touch the commutator.

Mechanical Inspection and Repairs

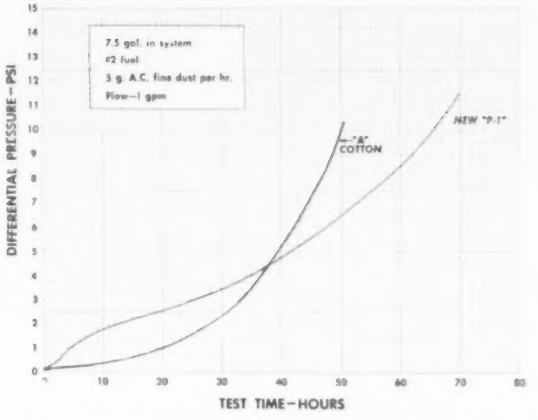
Look, as well as test. Many faults, such as short-circuited or open-circuited coils will cause discoloration from excessive heat. Check by smell for burned or scorched insulation. Look for telltale marks on the commutator. An open circuit will usually show up as a deep trench burned out between two bars (Fig. 3). Heating may result from high resistance connections or short circuits in the armature winding. This affects the particular coil and insulation, and may also result in discoloration and annealing of the connected commutator bar.

Check carefully all around the commutator for visible faults. If you suspect soft bars, use a hardness tester similar to the Shore Scleroscope (Fig. 4). The tester should be held squarely and solidly in position over the bar so that the pellet falls freely on a smooth surface. The hardness value is read on the scale as the height to which the pellet bounces after it has struck the surface of the bar. The reading may be as high as 20 or more, but 12 to 15 is satisfactory. A reading of less than 10 indicates annealed copper. Usually such soft

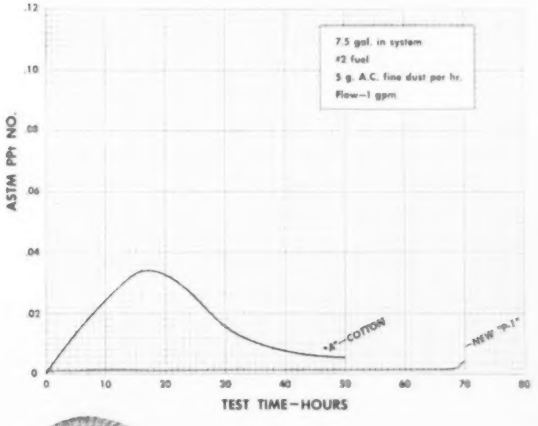
(*Continued on page 53*)

Applied Research in Filtration Saves Money for Railroads, too!

NEW CLEANLINESS IN FUEL AND LUBRICATING OILS EFFECTS MAJOR ECONOMIES IN DIESEL OPERATION



Test to demonstrate the comparative efficiency (retention of contaminants) and flow characteristics (pressure drop) of standard 2nd stage fuel filter cartridge "A" versus the new WIX P-1 pleated paper cartridge. With a condemnation limit of 10 psi, cartridge "A" indicates on the chart above a life cycle of 50 hours versus 66 hours for the new WIX development. Note that, throughout its longer service life, the WIX cartridge never exceeds trace amounts as opposed to the performance of cartridge "A" as shown on chart below.



Shown at the left—WIXITE Primary Fuel Filter Cartridge. At the right—the New WIX P-1 Second Stage Fuel Filter Cartridge whose outstanding performance is pictured above.

When a few specks, no larger than the point of a pin, can disrupt the entire schedule of a railroad system, the economic importance of clean fuel oil is well illustrated — but, in only one of its aspects. Engine trouble, caused by fuel failure, is a catastrophe. The day in and day out erosion of vital engine parts, which is the progressive penalty of contaminants in lubricating oil, may be equally costly. Combined, these problems represent significant sums in the annual operations budget.

Research and development by WIX, based on years of study, have made marked progress in the areas of both fuel and lubricating oil filtration. WIX Filter Cartridges were the first to supplant the old hand-filled waste packed filters which today are pretty generally recognized as "extravagant" economies.

Today WIX offers comprehensive coverage of all oil filtration needs on diesel locomotives . . . lubrication, primary and secondary stage fuel. This coverage embraces many filtering media so that engineering can prescribe the precise filtering formula to suit the engine and its characteristics as well as the service or environment in which it operates.

WRITE:

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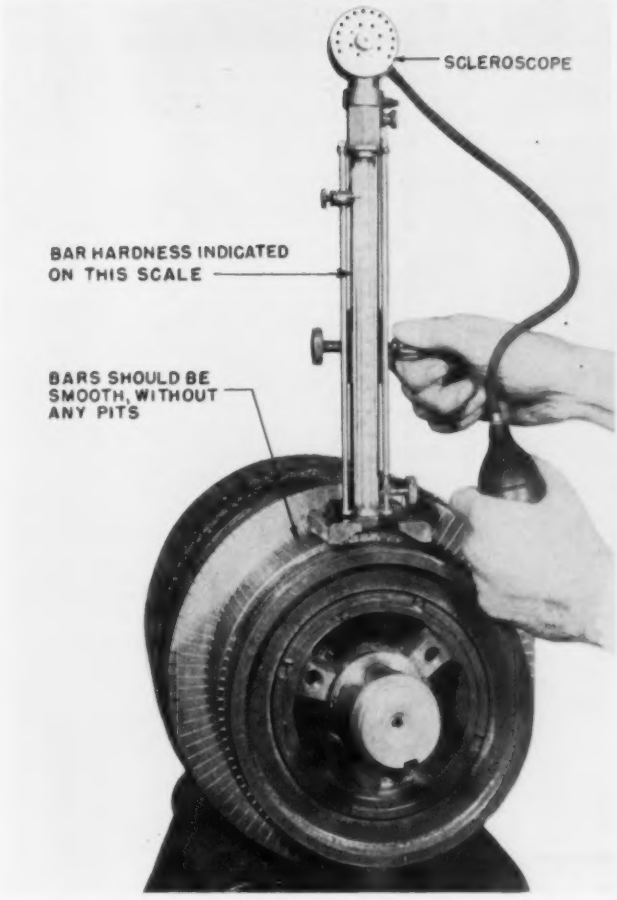


Fig. 4—Scleroscope can be used to test commutator bar hardness.

bars will also show visible signs of lifting and excessive wear. Turning the commutator in a lathe will be only a temporary solution. Such a commutator will require repairs to be described later.

Lifted or high-resistance leads may be detected visibly (see Fig. 5), as well as by the bar-to-bar resistance test. Occasional defects usually can be repaired by resoldering, carefully lifting the leads just enough to clean and flux the joint, and then drifting them into place. Special rosin fluxes are best for this purpose. If the usual acid fluxes found around a shop must be used, be careful to keep them off the insulation and be sure to wash away any surplus because electrical leakage faults could result.

Solder throwing usually results from overheating in service. If you find it, look for further damage, such as loose bands, and shrunken wedges. If most of the bars have thrown solder, and tests show only a moderately high resistance, a complete resoldering job may be done. If the machine has run for a while with this defect, conditions are different. The high resistance joints may then be so badly oxidized that a successful resoldering job is economically impossible. The armature will probably have to be rewound.

If, however, the winding is relatively new and in good condition it may be worth saving. Repairs can then by made by lifting all the top leads just enough to clean the risers and leads. The bottom leads are then cracked open with a shimming knife enough to allow flux to enter the joints. The leads are then reassembled, drifted and resoldered. Any soldering job should be checked later with a bar-to-bar test to insure adequate repair.

If the bands have not already been removed to clean

Fig. 5—Overheating due to lifted or high resistance leads causes discoloring.

the coils underneath, they should be carefully checked for looseness by tapping. A light ball-peen hammer is better for this than the usual shop hammer. Judgment and experience, plus a familiarity with the pattern of insulation wear usually accompanying relaxed bands, is necessary to detect this trouble in its early stages. Anyone can spot a "punky" loose band, but by then it has probably gone too far for help. The advanced stage of insulation wear it reveals probably spells an early job of rewinding.

Some shops prefer not to reband armatures, except on rewind, and therefore tolerate operation with relaxed bands. Others, by early rebanding, may be replacing bands that are still good. In general, the particular type of service encountered, and the experience of the individual railroad will play a large part in deciding whether the band stays or is replaced during basic overhaul.

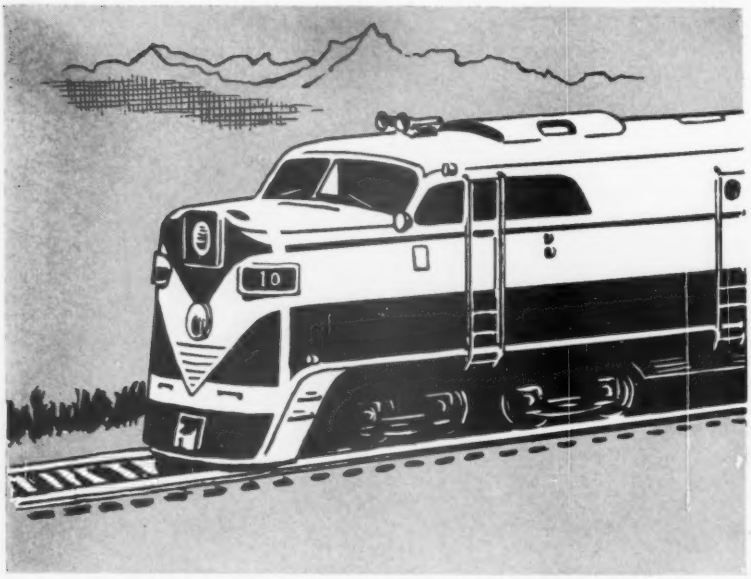
Other Tests

Most shops take advantage of every opportunity to Magnaflux the armature shaft. Because it can be easily done by utilizing the residual magnetism in traction motor shafts, this test should be made. The shaft taper, and bearing and collar fits should be closely inspected. Diameters can easily be measured, the taper "blued" to gage, and indicator runouts measured in a lathe.

If the armature is not slated for a rewind, the core laminations should now be examined for loose or broken teeth, and the slot wedges checked for tightness. The core stacking should be tapped radially and through the longitudinal ventilation openings to detect looseness which may require tightening or welding.

Electrical repairs requiring the lifting of a few coils from the slots and reinsulation of top grounds can usually be made. The work should be done by an experienced winder having the "know-how" for the job and the necessary special tools. Commutator work should be restricted to tightening, turning and sloting.

An open circuit, short circuit or ground that develops in service usually burns a substantial "rat hole" in the winding before it is detected. This requires extensive repairs, including stripping of the winding, core and commutator repairs. These will be detailed in succeeding chapters.



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YOU'RE *NOT* USING THE

most efficient and most economical method of cleaning your diesel locomotives!

Developed through years of experience in the railroad cleaning field, LIX cleaners meet perfectly the needs of the modern railroad for FAST, EFFICIENT, ECONOMICAL maintenance. No matter how dirty the diesel, in the Lix line there's a cleaner that will give you maximum results at minimum cost.

NO SCRAPING OR BRUSHING is necessary with LIX . . . all grit, grime and caked carbon are *soaked* away, with *amazing* thoroughness and speed. In tank-cleaning of diesel heads, liners, pistons and other parts, Lix cleaners are harmless to all metals during the cleaning cycle . . . and all metals can be cleaned in the same tank at the same time. Lix cleaners have good emulsifying qualities . . . leave no granular deposits . . . reduce after-rusting. They're *safer* . . . are low in toxicity, are not a fire hazard. Because they have *longer* life without frequent charges, they're *more economical* in the end than "less expensive" cleaners! The Lix line also includes evaporative type cleaners for spray use.

Remember . . . the *real cost* of a cleaner depends on the *results.*

You owe it to yourself to investigate the advantages of Lix cleaners . . . to prove to yourself how you can save time and cut costs on periodic surface cleaning of locomotives and on overall cleaning of diesel parts! Write, wire or phone for a LIX DEMONSTRATION in your shop without cost or obligation!

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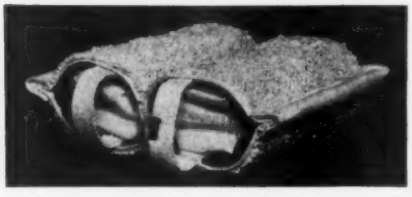
"Leadership in Industrial Cleaning"

What's New

(*Continued from page 18*)

manently attached to the straps pass around grooved quadrants at ends of restraining beams and are fastened to grab hooks on the face of the beam. These are connected to shock absorbers which, in turn, are connected to equalizers. The equalizers automatically adjust for chain length and pull. Turn buckles on the two inner restraining beams at the door of the car are used to pull the beams tightly against the lading and distribute load evenly on the four chains. The box car device is designed for lift truck loading.

On the flat car, channels bolted to the side sills take the place of the steel straps and the shock absorber assemblies are anchored to each side channel. A single ⅞-in. alloy chain connects the shock absorber assembly to the grabhooks at the ends of the turnbuckle screws. Because the flat car is designed for crane loading, both the end and inner beams have turnbuckles to tighten the palletized load. Removable covers are provided to fit outside of the side channels and rest on the car deck for weather protection. *Brandon Equipment Company, Inc., Dept. RLC, 332 S. Michigan ave., Chicago 4.*



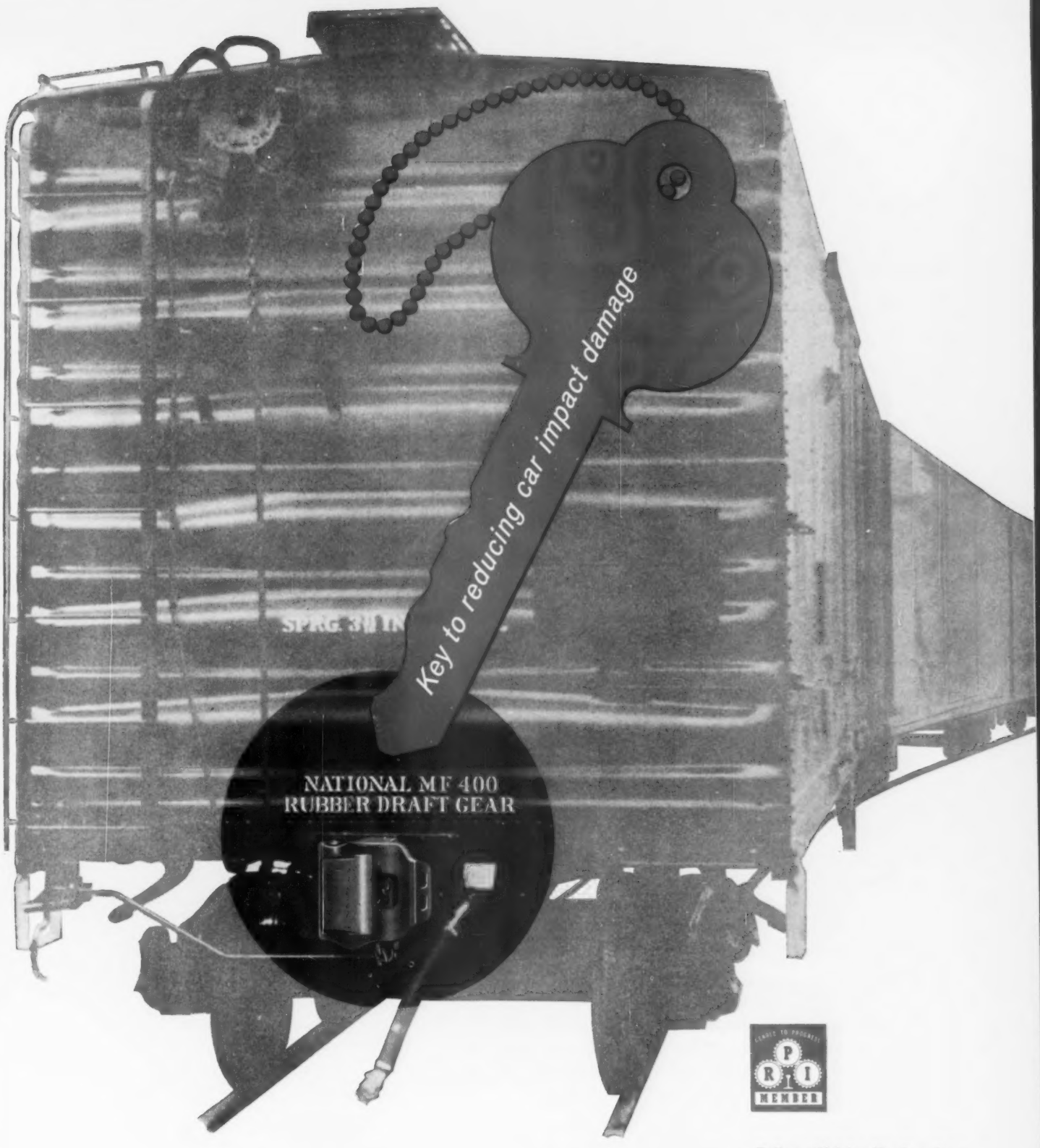
Journal Lubricator

The Albert twin type reversible lubricating pad consists of an outer blanket of 100 per cent cotton fibers entirely tufted with a highly absorbent lamp type wicking. It is backed up with a special felt to insure immediate absorption of oil. The felt is sewed to the wicking and the outer wrap for instant wicking from the oil reservoir. Canvas duck, double edge wrapped to prevent wear on the sides, encloses a reinforced tempered blue steel spring assembly to hold the pad at proper height. The spring assembly is said to be unaffected by oil and heat and keeps the pad in contact with the journal at all times. The canvas back edging is double stitched to prevent end wear. Handles are wicked, and sewed across the entire pad providing additional strength for easy application and removal. A brass tag on the handle identifies the size. The pad has been approved by the AAR for test applications. *Albert Manufacturing Company, Dept. RLC, 4912 Hohman ave., Hammond, Ind.*

Metal Surface Prepaint Treatment

"Safe-Tee" Solvent F.O.-190, when used as a prepaint treatment, is said to leave a slightly roughened surface which is passivated

(*Continued on page 56*)



National MF-400 Rubber-Cushioned Draft Gears have a rated capacity of 42,500 foot-pounds plus a 54 per cent reserve capacity—a *total of 65,500 foot-pounds.* This ample reserve gives your cars protection when they need it most—at high impacting speeds. And, during regular road operations, the MF-400 provides excellent protection against severe shock due to run-in and run-out of slack.

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Here's why the ROCK ISLAND adopts Plastinail* as a means for restoring B and C FLOORS

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"Based on these tests we have begun, in our El Reno, Oklahoma shop, a schedule of reconditioning floors with Plastinail as soon as they drop into B or C service.

"We have found that when a sound B or C floor is Plastinailed it will provide seven or eight years or more of Class A service. And a Plastinail floor is better — smooth, inorganic, non-absorptive, nailable, easily prepared. Shippers like it. Our damage claims are less.

"And here's the vital point: Plastinail costs less to install than a new wood floor. The first cost is less, and the service is supreme. A Plastinail floor stays in Class A long after a new wood floor has dropped into Class B or C."

Do you have the facts and figures on Plastinail Nailable Cement Floors? Write or phone us for a representative to call.

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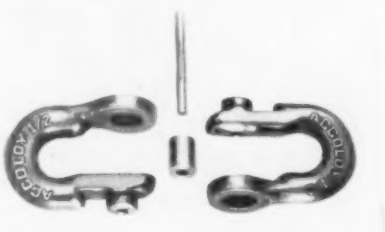
and forms a firm bond for the primer coat. The resulting surface is corrosion-resistant. The solvent is recommended for the removal of soil and corrosion from aluminum, copper, tin, stainless steel, and alloys of aluminum, copper and ferrous metals where subsequent surface coating is unnecessary. It is completely water soluble, has no unpleasant odor, and comes in 1-gal bottles (four to a case) and in specially lined 15-gal steel drums. *Fine Organics, Inc., Dept. RLC, 211 East 19th st., New York 3.*

Cleaning Gun

A percussion cleaning tool, the Airnesco cleaning gun, has been designed for cleaning machinery, motors, cars, wheels, and other equipment. This tool can employ air alone, air and steam, air and chemicals, or can be used for sanding blasting.

Unbalanced pressure valves accelerate the compressed air stream. When the operating control is opened, a valve automatically opens and closes in direct ratio to the losses in the air line, approximately 65 times per second. This converts the steady compressed air flow into a kinetic force at about 20 times the pressure of the source. It is said that 80 psi through the gun produces a force equal to 1,600 psi. The gun illustrated weighs about 5 lb. Air pressure may range from 60 to 150 psi, and consumption ranges from 20 to 250 cfm as needed. *L. C. Nesham Company, Dept. RLC, S. Third st., Allentown, Pa.*



Chain Repair Links

These Accloy body chain repair links are designed to meet and exceed the minimum breaking requirements of alloy chain. As-

(*Continued on page 58*)

are YOU protected against POWER FAILURES ?

SAVE yourself high costs and inconvenience— of claims, work stoppage, and property damage with

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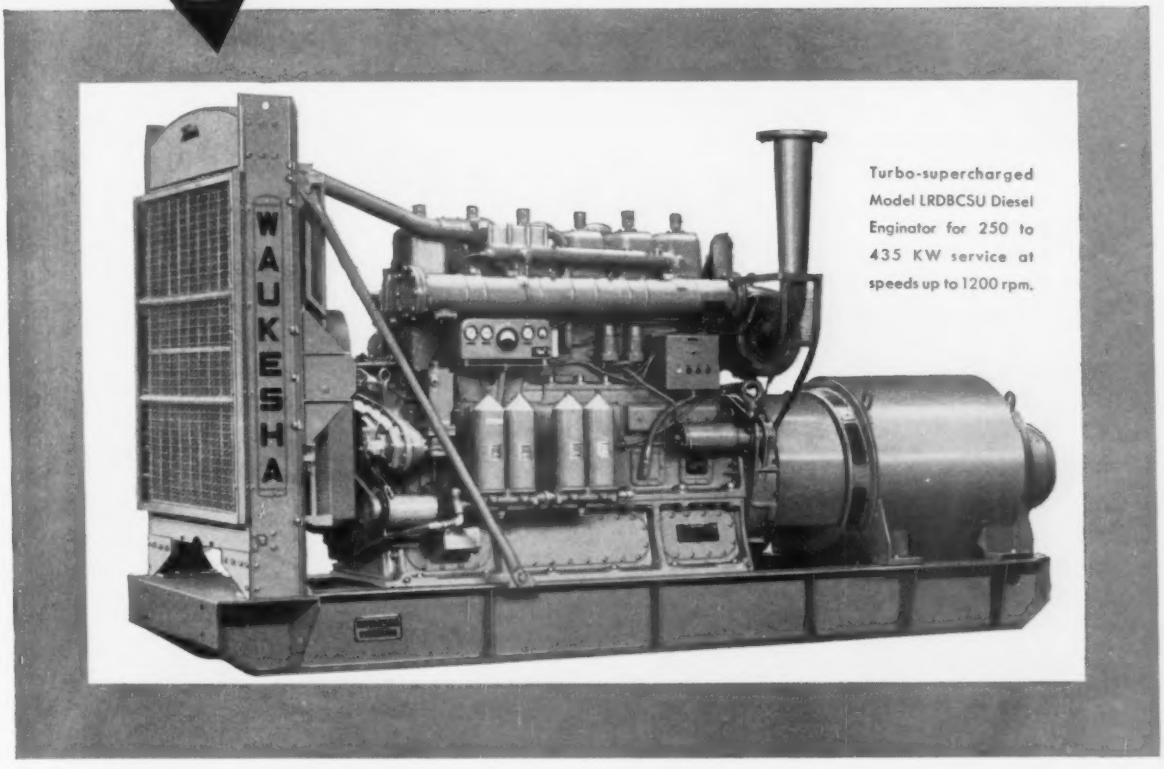

Turbo-supercharged Model LRDBCSU Diesel Enginator for 250 to 435 KW service at speeds up to 1200 rpm.

● Out goes the power . . . then what happens? At the classification yards? At the terminals—passenger, or freight? Signal equipment? Will the public and your personnel be safeguarded? And perishables properly protected?

The best answer is Waukesha Enginators—not only for stand-by service, but for prime service, too. These Waukesha Engine-driven generator sets are completely automatic and fully equipped with start-up, safety shut-down, and operating controls—in combination voltages with electrical characteristics to specifications. Available for Diesel, gas, and gasoline fuels, up to 800 KW. Write for descriptive bulletins.

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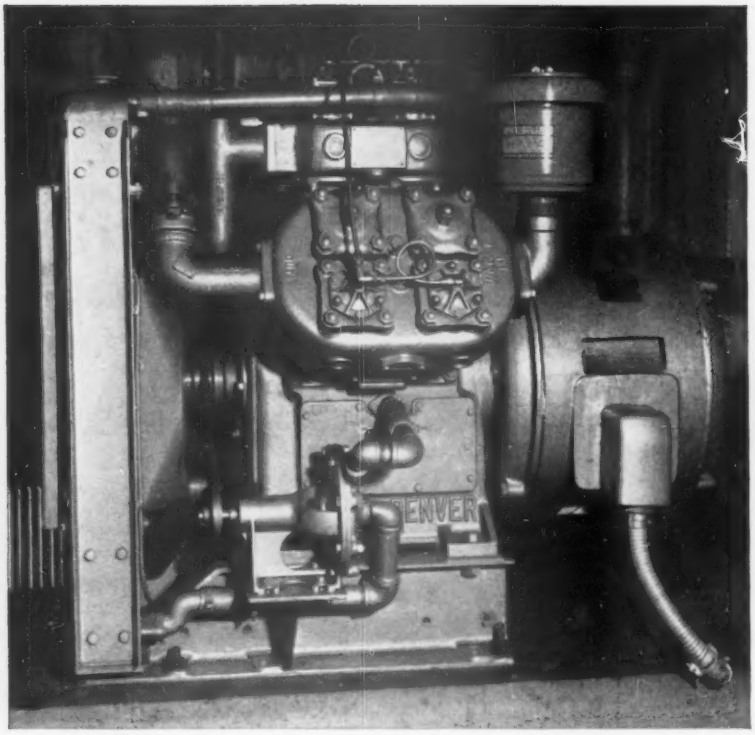
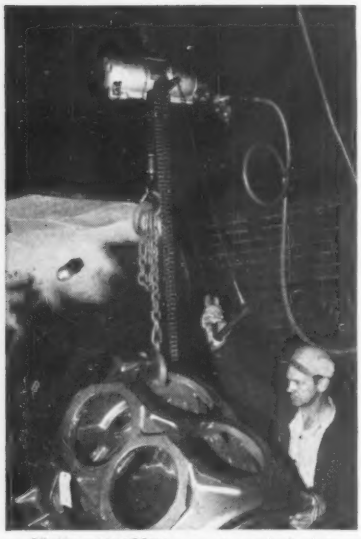


Gardner-Denver WB

Maintain with air... Gardner-Denver air and tools



Keller 86-2V20, one-ton air hoist

Here's real "go power" for the many air jobs around the car and engine shop: the Gardner-Denver WB compressor. This compact, water-cooled compressor package is designed to meet air demands without special handling . . . runs steady with minimum maintenance. Eight models to choose from: displacement from 142 to 1150 cfm.

For rugged, keep-on-the-go air tools, choose from the Keller line of air hoists, impact wrenches, drills and grinders . . . Gardner-Denver air motors, breakers, diggers, tampers. These quality tools stay on the job, need little servicing.

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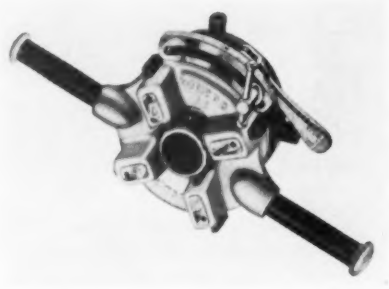
Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 16, Ontario

sembly and disassembly is quick and simple—no special tools or skills are necessary. The link bears the load, the tubular spacer acts as a stud and the drive pin secures the entire assembly.

The ACCO links are available for repairing or connecting idle tail ends of chains in ¼, ⅜, ½, ⅝ and ¾ in. sizes. *American Chain & Cable Co., Dept. RLC, 929 Connecticut ave., Bridgeport 2, Conn.*

Portable Drier

The No. 444 Portable Diesel Dryer (PDD) delivers combined hot-air and infra-red heat to the interiors of diesel main generators and traction motors. The regular traction motor can be replaced by PDD which has bracket plates with keyholes. The keyholes fix the position of PDD directly above the commutator of the motor, allowing hot air and infra-red heat from three General Electric 500-watt quartz infra-red lamps, to reach the interior. There is a hot-air blower with adjustable air intake. The unit may be plugged into any 115-volt lighting circuit outlet. The time required to thoroughly dry a faulty motor averages five hours, according to the manufacturer. *Miskella Infra-Red Company, Dept. RLC, Cleveland 4.*



Cam-Type Die

The No. 44 and No. 66 cam-type die heads are fully adjustable to cut oversize, undersize, or standard threads—the former, ⅛- to ¾-in. pipe, ¼- to 1⅛-in. bolt; the latter, 1- to 2-in. pipe and 1¼- to 2-in. bolt. The floating scoll acts only to control thread

(Continued on page 60)

Slash assembly and repair time on railroad rolling stock

● Whatever the job . . . CL Huckbolts are being used by modern car builders and repair shops to slash assembly time, conserve manpower, and keep the stock rolling.

Driving CL Huckbolts is so simple and easy that 25 can be installed with ONE gun in ONE minute.

With CL Huckbolts you get positive sheet pull-together, no bulbing between sheets and since no human factor is involved in the driving operation, completely uniform tension.

The smooth, flat head and the tension preload properties of the CL Huckbolt make it safe for bagged or packaged lading and prevents water trapping and decay when used for flooring.

Complete information and samples are available from your local Huck Representative—or write . . .

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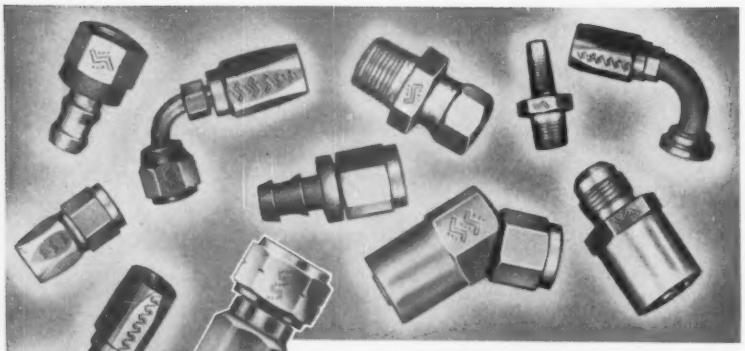

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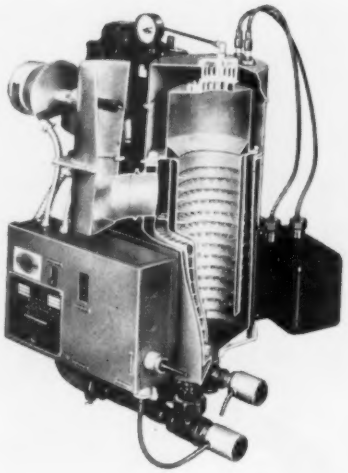
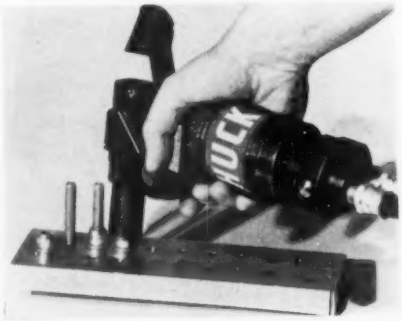
size, and an easy-to-read size gage makes it possible to set for standard, over, or undersize thread. Dies are released instantly from the completed thread. An optional pipe-centering device, with elongated centering feet, can be quickly removed if desired. *Toledo Pipe Threading Machine Company Dept. RLC, 1445 Summit st., Toledo 4, Ohio.*



Conversion Kits for Heaters

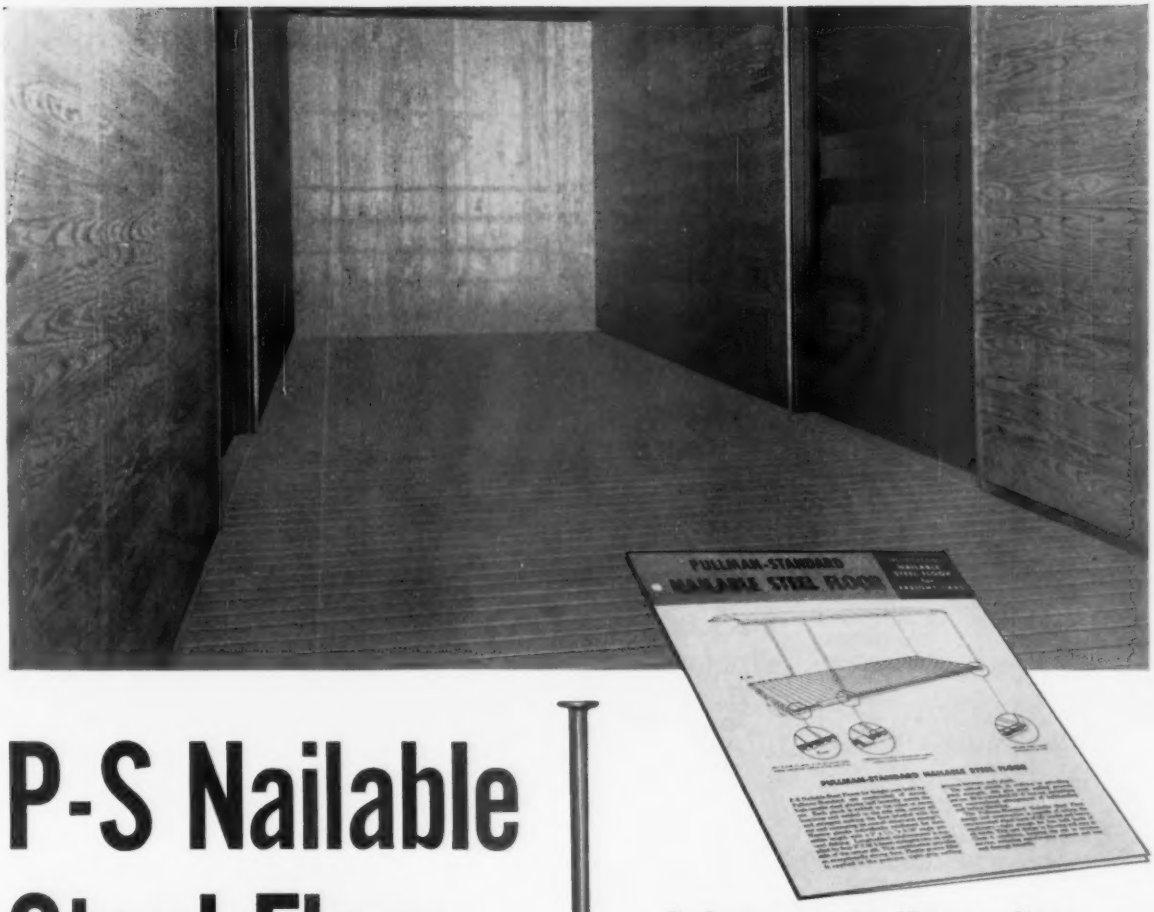
All Model 4915 Watchman heaters can now be modernized to the 4916 type by conversion kits which include a new combustion chamber and blower housing. Other improvements include a fixed position for the electrodes and fuel nozzle. An after purge cycle in the controls keeps the nozzle tip from carbon build-up. The exhaust stack from the heater has been flared out from 4 to 6 in. to reduce back pressure. *Vapor Heating Corporation, Dept. RLC, 6420 West Howard st., Chicago, 31.*



Lockbolt Fastener

A utility design of Huckbolt fastener, lower in cost and handling a wider material thickness range, incorporates the basic features of the standard fastener. This C6L fastener extends the range of material thicknesses that

(*Continued on page 62*)



P-S Nailable Steel Floor

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Take just a moment to discover the benefits of Pullman-Standard Nailable Steel Floor. Write for a copy of this fact-filled booklet. Study it . . . compare it to *any* floor. Compare strength, durability, nail-holding power, long-range economy. Whatever comparisons you make, you'll find P-S Nailable Steel Floor gives your railroad the greatest floor value on the market.

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can be joined with a single size, simplifying the inventory problem.

It is available in 3/16-, 1/4-, 5/16-, 3/8- and 1/2-in. nominal pin diameters and in all head styles for metal-to-metal application. *Huck Manufacturing Company, Dept. RLC, 23704 Woodward ave., Pleasant Ridge, Mich.*

Luminaire Hanger

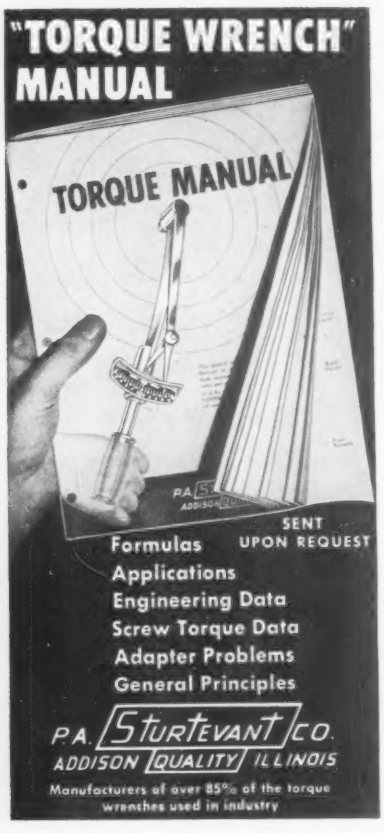
This disconnecting and lowering hanger is for use with hi-bay fluorescent, mercury and incandescent luminaires or clusters weighing from 60 to 120 lb. It features a newly designed multiple-fall pulley system with a 3-to-1 mechanical advantage for handline operation, and permits one workman to lower, relamp, clean and then reposition heavy hi-bay lights within minutes. There are no climbing or electrical dangers because all work is accomplished at floor level with a dead fixture.

These Triplex hangers are available with a wide variety of specially designed suspension assemblies for diversified installations. *Thompson Electric Company, Dept. RLC, P.O. Box 873-BR, Cleveland 22.*

Insulation Test Instrument

The VON 100 KV (5 milliampere output at 100,000 volts) d-c insulation test instrument weighs only 80 lb. It tests and evaluates insulation condition of large motors, generators, transformers, cables, and high-voltage electronic assemblies, reducing the chance of breakdown.

The instrument is powered by selenium rectifiers and uses no tubes. It is available also in 150-, 200-, and 250-kv ratings. *Hewson Company, Dept. RLC, 443 Broad st., Newark 2, N.J.*



Letters—*Cont'd from p. 14*

Mandatory Bearing Replacement

TO THE EDITOR:

Summer, to most, is a season of vacation. To the railroad man, however, it bitterly spells out just two words: "Hot box."

I believe that in journal lubrication research, too much emphasis has gone toward box packing as the source of trouble. While the new lubricators are essential in combating the hot-box problem, I believe that, as long as the present AAR condemning limits for inspecting solid bearings stand, we shall always have a hot-box problem. Bearing inspection is left up to the box packer at any repair track for his own interpretation of Interchange Rule 66. Regardless of wear contour, if a bearing falls short of the condemning limits, it is reinserted and let run —probably to cause a hot journal a short time after.

It should be mandatory that all friction bearings be removed and new or reconditioned bearings put in their place, either every time a car is repacked or at every second time if the repack period is 18 months. Cars that are equipped with lubricators, with the 24-month repack period, should have bearings changed with each repacking.

Statistics show the average life of a friction bearing is 36 months. Any car equipped with AAR-approved lubricators need only be repacked every 24 months, with no provision made for the fact that 12 months after initial repacking, the statistical life of each bearing will have expired.

Such a plan sounds like a radical and costly method to stop hot boxes, but this is necessary to eliminate this situation. Costs due to equipment destruction and actual train delay caused by hot boxes are easily totalled, but the cost to railroads through loss of shipper satisfaction and good will, because of hot-box delay, can never be counted.

Train-yard inspection, of course, is vital to the safe running of every railroad, but a man cannot effectively detect a loose or spread lining on a solid bearing with just a packing knife and feeler. Obvious defects such as a broken lug or waste grab, are readily discernible. In the rush to get trains out on time, would not an inspector, if he had something more important to do (or if he just didn't care), be prone to bypass the defect and let the car run, rather than handle a heavy jack to remove the offending brass?

The answer, then, obviously is not detecting failing lubrication, but in the prevention of it. A workable box seal to retain oil, a simple and absorbent lubricator, and systematic reconditioning of friction bearings might reduce the hot-box problem from a menace to nothing.

E. B. Devlin
Erie

Personal Mention

Central of Georgia.—*Macon, Ga.:* JOHN D. COWAN, toolroom foreman, appointed general foreman, locomotive shop, succeeding GUY N. CAGLE, retired.

Canadian National.—*Moncton, N.B.:* J. G. BOURGEOIS, appointed foreman in freight-car shop. Formerly car foreman at Riviere due Loup.

Chicago & North Western.—*Chicago:* WILLIAM A. BOWLDS appointed mechanical inspector-car.

Chicago Great Western.—*Oelwein, Ia.:* H. E. MORAN appointed assistant superintendent motive power and equipment, succeeding G. H. JOHNSON, retired. H. P. LUKEHART appointed general car foreman, succeeding Mr. Moran.

Delaware & Hudson.—*Albany, N.Y.:* ALTON C. WOODARD, road foreman of engines, Saratoga-Champlain Division, appointed chief road foreman. *Oneonta, N.Y.:* MARVIN A. DAVIS, road foreman of engines, Pennsylvania-Susquehanna Division, appointed road foreman. *Whitehall, N.Y.:* HOMER I. KNOTT, assistant road foreman of engines, appointed road foreman. *Carbondale, Pa.:* STANLEY M. FARRELL, assistant road foreman of engines, appointed road foreman. *Colonie, N.Y.:* JAMES H. SOFFORD, appointed road foreman. Formerly assistant road foreman of engines at Oneonta.

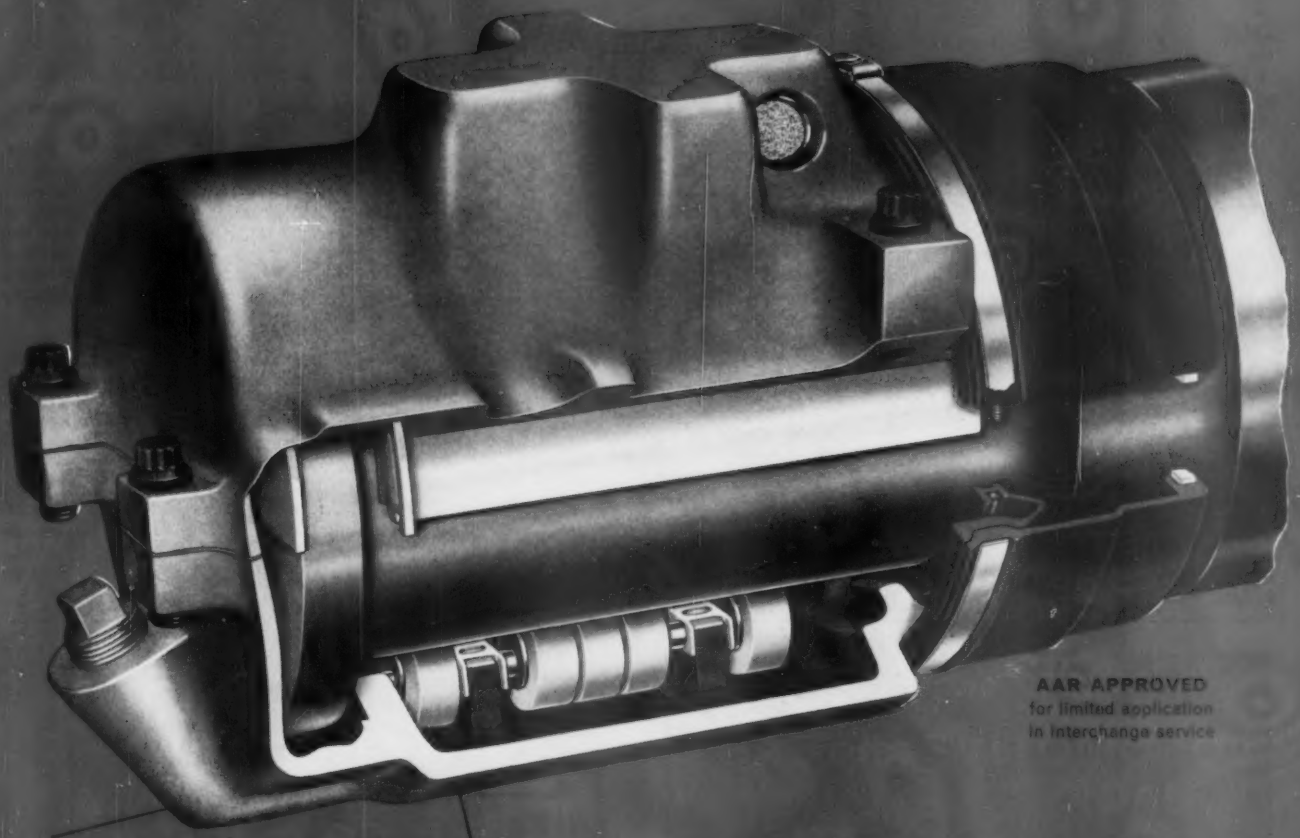
Denver & Rio Grande Western.—*Denver:* WILLIAM J. HOLTMAN, assistant to chief mechanical officer, appointed chief mechanical officer, succeeding ARTHUR E. RICE, retired.

New York Central.—*East Rochester, N.Y.:* GLEN F. STINER, assistant estimating engineer, appointed engineer supervisor, mechanical department. *New York:* R. H. MILLER appointed lubrication engineer, succeeding M. M. O'NEILL, resigned.

Norfolk & Western.—*Roanoke, Va.:* C. B. SPILLAN, boilermaker foreman, retired, after 52 years with the road.

(Continued on page 64)

PROGRESS REPORT



AAR APPROVED
for limited application
in interchange service

CLEVITE Sealed Sleeve Bearing Cartridge

...new, permanent, soundly engineered and economical journal bearing conversion for freight cars.

...Doing a GOOD Job!

Tough road and laboratory tests under severest service and simulated conditions show the performance of Clevite Cartridges to be far more satisfactory than ever expected.

In actual application checks, Clevite Cartridges proved they require less modification of equipment and are installed at lower cost than any other permanent conversion.

Keep your eye on CLEVITE!

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STANDARD CAR TRUCK COMPANY

332 S. Michigan Ave., Chicago 4, Illinois. *In Canada:* Consolidated Equipment Co., Ltd., Montreal 2, Quebec

The CLEVITE Bearing Cartridge is a development of Cleveland Graphite Bronze division of Clevite Corporation

Pennsylvania.—*Philadelphia:* WARREN R. ELSEY, vice president, retired. Mr. Elsey mechanical engineer in 1936.

Southern.—*Atlanta, Ga.:* DONNIS L. TALBERT appointed assistant foreman.

Supply Trade Notes

GENERAL ELECTRIC COMPANY.—*Oscar L. Dunn* appointed general manager, Motor and Generator Division, at Schenectady, N. Y., succeeding *James M. Crawford*, vice-president and general manager retired.

■

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIVISION.—*Robert L. Evans* appointed vice-president in charge of engineering.

■

PENNSALT CHEMICALS CORPORATION.—*Robert R. Pierce*, sales manager, appointed manager, and *James H. Cogshall*, sales manager, Corrosion Engineering Products Department. Mr. Cogshall previously sales engineer.

■

THRALL CAR MANUFACTURING COMPANY.—*Charles A. Mapp* appointed assistant vice-president—sales. Formerly assistant manager, Railroad Division, Fairbanks Morse & Co.

R. M. Covert

C. H. Leet

W. A. Baltzell

Robert W. Pittman

UNION ASBESTOS & RUBBER CO.—*Robert M. Covert*, assistant to vice-president in charge of Equipment Specialties Division, appointed manager, Equipco Hand Brake Division, succeeding *Arthur F. O'Connor*, retired.

■

ELECTRIC STORAGE BATTERY COMPANY.—*C. H. Leet*, Exide Industrial sales branch official in Chicago area, heads marketing of Electric Products battery-charging equipment, Exide Industrial Division, *John W. Weight*, New York branch sales manager, retired.

■

RAILROAD FRICTION PRODUCTS CORPORATION.—San Francisco office moved to 812 Industrial Indemnity building, 155 Sansome street, Zone 4.

■

K S M PRODUCTS, INC.—Canadian plant and sales office, known as "K S M of Canada, Ltd.," established at 379 Bering avenue, Toronto, Ont.

OAKITE PRODUCTS, INC.—*J. Justin Basch* appointed to new position of marketing vice-president, responsible for sales, engineering and marketing research. Formerly vice-president for research and product development. *William A. Baltzell*, assistant sales manager, appointed industrial sales manager. *Dr. Clarence Bremer*, director of research, appointed technical director.

■

ALCO PRODUCTS, INC.—*Robert W. Pittman* appointed sales manager for transportation products and services, and *Robert H. Binkerd*, sales manager, industrial equipment, spring and forge division.

■

PULLMAN-STANDARD CAR MANUFACTURING COMPANY—Second phase of a multi-million dollar expansion-improvement program under way at Bessemer, Ala., freight-car plant will add about 35,000 sq ft

(*Continued on page 66*)

WESTERN
LOCOMOTIVE and CAR
JACK
lifts capacity
loads easier

WESTERN has made the first major change in Locomotive and Car Journal Jacks by adding TIMKEN tapered thrust roller bearings, replacing ball bearings. This major improvement means reduced friction, greater speed, easier operation and less maintenance . . . available in 25, 35 and 50 ton capacities. Aluminum or malleable steel housings available in 25 or 35 ton models.

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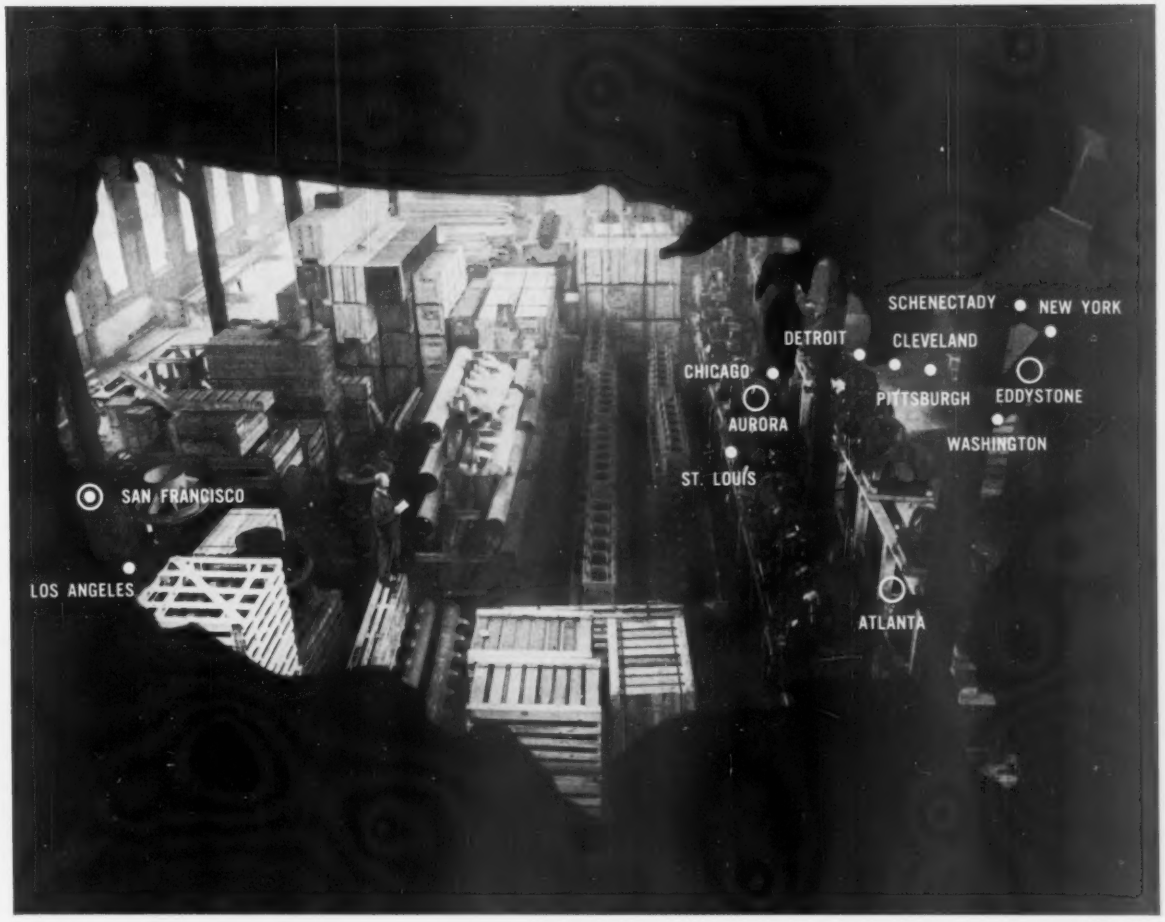

● Sales Offices ○ Renewal Parts Warehouse

Shown above is one of the huge diesel parts warehouses at Eddystone

Just a word from you sets the wheels in motion... and Baldwin diesel renewal parts are on their way!

Today, as always, Baldwin provides the ultimate in both parts and service for its thousands of diesel locomotives throughout the world. Only from us can you get exact duplicates of the original components of your Baldwin locomotive. Each Baldwin renewal part is made, like the original, by skilled workers and to the same high standards to assure you longer, trouble-free performance.

Swift service on Baldwin diesel parts is supplied by four strategically located warehouses, all geared for immediate handling of your needs. And remember that there is a nearby B-L-H district sales office always at your service.

BALDWIN · LIMA · HAMILTON

Eddystone Division

Philadelphia 42, Pa.

Hydraulic turbines • Weldments • Dump cars • Nonferrous castings • Special machinery • Bending rolls • Machine tools

Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

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504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

of manufacturing area, enabling P-S to turn out 2,000 tons of freight-car parts per month while maintaining its capacity building schedule of new freight cars.

■

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*W. W. Wagner*, Chicago representative, appointed representative in St. Paul. *D. R. Phillips*, service engineer, appointed representative in western district; headquarters, Chicago.

San Francisco offices moved to 812 Industrial Indemnity building, 155 Sansome street.

■

JOURNAPAK CORPORATION. — *Security Railway Products Company* reappointed a distributor in the United States for Journapak.

■

C & D BATTERIES, INC.—*Joel Scallen*, 6319 Humboldt ave., Minneapolis, representing C & D in Minneapolis area.

■

TEXAS COMPANY.—*J. C. Droke* appointed manager of railway sales at New York, succeeding *J. B. Flynn*, retired. *D. C. Akers* succeeds Mr. Droke as assistant sales manager. Mr. Akers formerly assistant division sales manager, Chicago Division, railway sales.

■

CORNING GLASS WORKS.—*R. Dale Sweigart* appointed manager of newly created Industrial Components Sales Department formed by merger of Railroad and Industrial Sales and Appliance Parts Sales departments.

■

JOHN A ROEBLINGS SONS CORPORATION.—*Charles A. Wagner*, assistant manager of sales, appointed Philadelphia district manager, Wire Rope Division.

■

A. M. BYERS COMPANY.—*John G. Cumming* appointed manager, southwestern division, with headquarters in Houston, Tex. Following appointed service engineers: *R. E. Beisler* and *R. Spurgin*, Chicago; *N. J. Cremonese*, Silver Springs, Md; *G. F. Grey* and *W. O. Williams*, Houston; *M. E. Hanley*, New York; *L. H. Hawks*, Boston; *E. M. Jones*, Pensacola, Fla.; *K. E. MacDonald*, Cleveland, and *L. L. Swaney*, Pittsburgh.

Obituary

J. GARDNER BROOKS, manager of sales, United States Steel Corporation, Indianapolis, died May 8 of a heart attack.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

CRIB OPERATIONS. 4-page folder, KD-844, "Simplify Tool Crib Operations," describes a new three-way tool crib control system for eliminating the "lost tool" problem. (Write: *Remington Rand Division, Sperry Rand Corporation*, Dept. RLC, 315 Fourth ave., New York 10).

SILICONE RUBBER INSULATED CABLES. 16-page "National Electric Nepco-Sil Silicone Rubber Insulated Cables," for railroad design and structural engineers, discusses indivdual specfying factors, including performance data, service life, electrical characteristics, suggested applications, and test results. (Write: Advertising Department, *National Electric Products Corporation*, Dept. RLC, 2 Gateway Center, Pittsburgh 22.)

EP LUBRICANT. 8-page Bulletin No. 116 contains a chart for machine-shop personnel showing where and how Molykote lubricants should be applied. (Write: *Alpha-Molykote Corporation*, Dept. RLC, 65 Harvard ave., Stamford, Conn.)

SPECIALTY ALLOYS AND FLUXES. "Users" catalog folder briefs data needed in selecting specialty alloys and fluxes. Covers steel, aluminum and aluminum alloys, cast iron, copper and copper-bearing alloys, magnesium, nickel, monel, stainless steel, etc. (Write: *All-State Welding Alloys Company*, Dept. RLC, 249-55 Ferris ave., White Plains, N. Y.)

NEPCOZONE INSULATION FOR WIRE AND CABLE. 27-page handbook of butyl insulation contains an analysis of chemical structure of butyl insulation and a description of manufacturing processes. Charts and technical listings in table form give data about Nepcozone insulation's electrical qualities, high heat serviceability, temperature resistance, and aging properties. (Write: *National Electric Products Corporation*, Dept. RLC, 2 Gateway Center, Pittsburgh.)

SLING CHAINS. 8-page bulletin, DH-39, describes complete line of Kuplex sling chains in 1-, 2-, 3- and 4-leg styles, with sling hooks, sling grab hooks, and foundry type hooks. (Write: *American Chain & Cable Co.*, Dept. RLC, 929 Connecticut ave., Bridegport 2, Conn.)

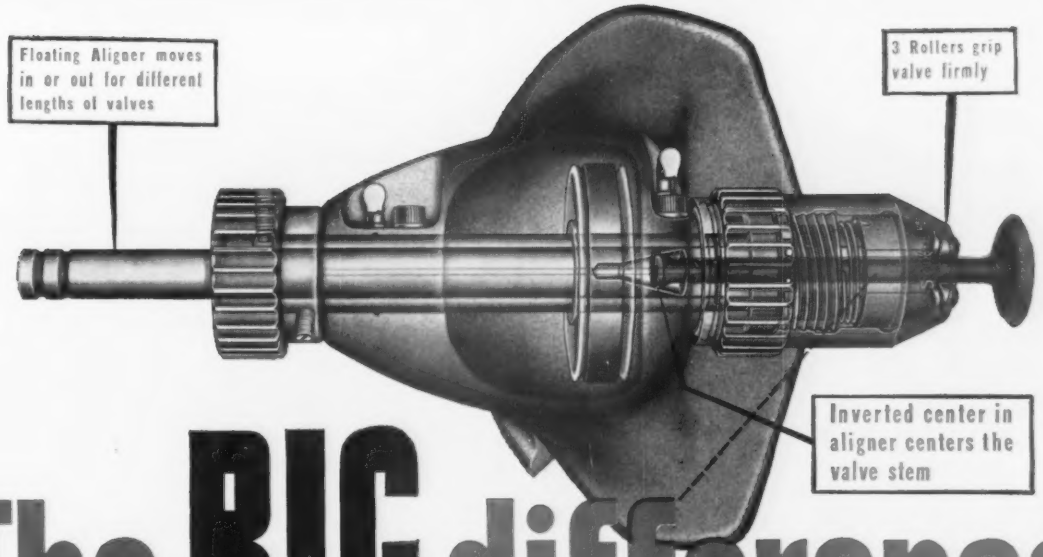
MACHINE WELDING DEPARTMENT. 6-page folder (Form ADG 2076A) describes various types of machine welding installations custom engineered by Airco's Machine Welding Department. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, Dept. RLC, 150 East 42nd st., New York 17.)

ADHESIVES; COATINGS; SEALERS. 23-page catalog lists, in numerical form, Military, Army, and Federal specifications, their definitions, and the corresponding 3M adhesive, coating, or sealer that meets United States Government Specifications. (Write: *Minnesota Mining & Manufacturing Co.*, Dept. RLC, 411 Piquette ave., Detroit 2.)

"HOW TO STRIP PAINT." Booklet F7893 describes 12 different paint stripping compounds—alkaline, solvent, and solvent-acid—and four stripping methods. Discusses also treatment of metals before repainting, and prevention of rust on stripped surfaces in storage. (Write: *Oakite Products, Inc.*, Dept. RLC, 146 Rector st., New York 6.)

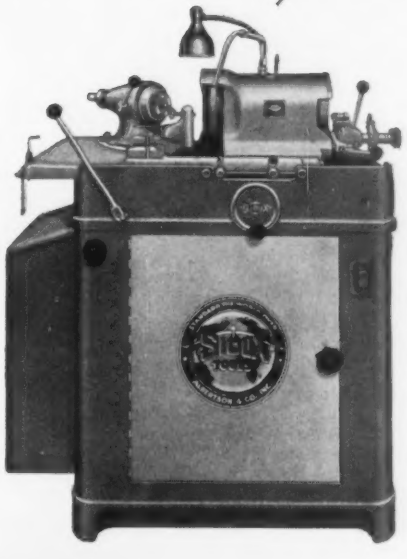
MAK DIESEL LOCOMOTIVES. 10-page booklet describes in general terms the MaK 2,000 BB and 2000 CC 2,000-bhp diesel locomotives, with more detailed data on such components as the engine, power transmission, trucks, chassis, brakes, etc. (Write: *MaK Maschinenbau Kiel Aktiengesellschaft*, Kiel-Friedrichsort, Germany.)

CENTERLESS GRINDER. 22-page booklet describes the Cincinnati Filmatic No. 2 centerless grinding machine. General specifications included. (Write: *Cincinnati Milling Machine Company*, Dept. RLC, Cincinnati 9.)


Floating Aligner moves in or out for different lengths of valves
3 Rollers grip valve firmly
Inverted center in aligner centers the valve stem

The BIG difference

is in the SIOUX QUICK-ACTING ROLLER CHUCK!



IF you had to choose one feature making the largest contribution to the speed and accuracy of the SIOUX Valve Face Grinding Machine it probably would be the quick-acting, easily cleaned, roller chuck. The inverted center floating aligner holds the valve accurately in the position in which it operates in the engine while valves are ground to within .001". It's fast, easy and accurate.

But as in all fine machinery, there is precision in a multitude of details. Belts absorb vibration . . . a cast iron base provides rigidity and weight . . . way bars are precision made, hardened and ground to close limits, and wet grinding eliminates heat and distortion.

For over 25 years men who have to lay down their hard earned money have been comparing and choosing the machine they liked best. The results are that today there are more SIOUX Valve Face Grinding Machines in use than all others combined. Buy SIOUX and you buy the finest.

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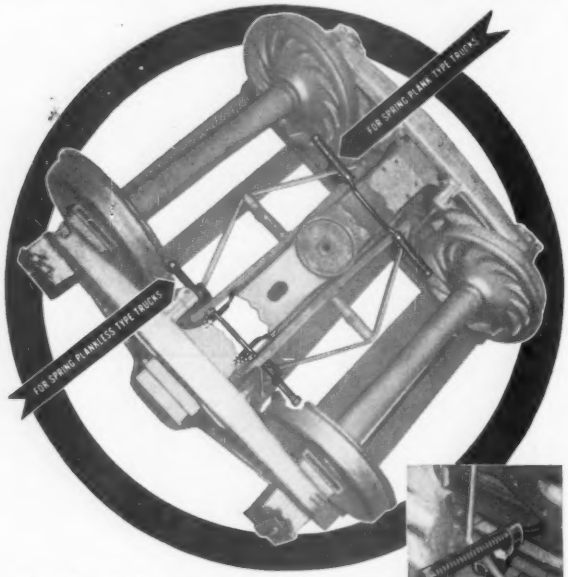
NEW AIR IMPACT WRENCHES • *NEW* AIR SCREWDRIVERS • *NEW* "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • VALVE FACE GRINDING MACHINES • SCREWDRIVERS • PORTABLE SAWS • FLEXIBLE SHAFTS • ABRASIVE DISCS

THE IMPROVED GRIPCO BRAKE BEAM SAFETY SUPPORT



SPRING-PLANK TYPE

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.

SPRING-PLANKLESS TYPE (Safety Loops Included)

ENGINEERING IMPROVEMENTS

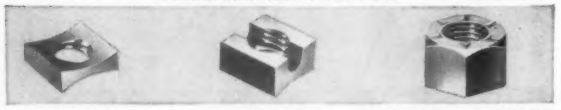
1. One design fits both 5'-6" and 5'-8" wheel base trucks.
2. One rod length and one spring length. One interchangeable casting fits both spring plank and spring plankless trucks.
3. Ideal for interchange repairs. New design permits easy and fast applications under all conditions. Nuts need not be removed to apply or remove the support.

OUTSTANDING FEATURES

1. An inexpensive trouble-free support for Rebuilt Car Programs.
2. Designed for spring plank and spring plankless trucks. Spring plankless trucks require safety loops which can be bolted, riveted or welded to the bolster.
3. Supports the brake beam in the event of brake beam or hanger failure.
4. Holds brake beam in horizontal position.
5. Holds brake shoe in proper position in relation to the periphery of the wheel.
6. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
7. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
8. GRIPCO supports can be removed and reapplied without removing nuts; therefore nuts are furnished in proper position.
9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
10. Can replace as a billable repair any support except A.A.R. recommended practice (angle-riveted and welded).

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

OTHER GRIP NUT PRODUCTS AD NO. 110



Grip Lock Nut #1 Grip Holding Nut #2 Railroad Gripco Lock Nut #3

GRIP NUT COMPANY

Serving American Railroads Since 1904

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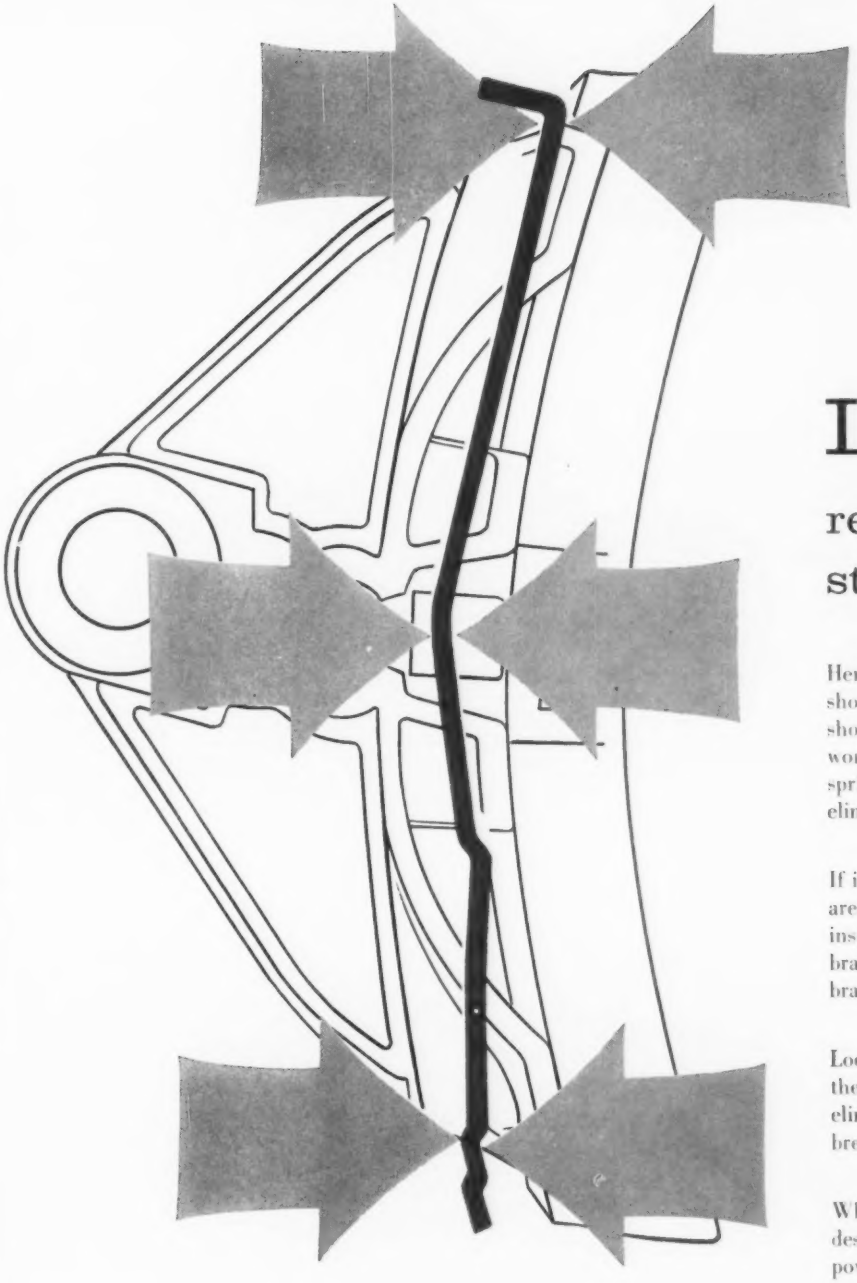


Lockey

reduces shoe breakage
stops brake head wear

Here's a simple way to extend the life of your brake shoes, heads, and beams. When a car comes into the shop or the repair track, apply a Lockey in place of the worn standard key. The Lockey with its powerful spring action will firmly clamp the shoe to the head and eliminate destructive play between the parts.

If it makes good sense on new cars—the great majority are equipped with Lockeys—it makes good sense to install them on equipment in service. Lockeys will stop brake head wear and eliminate the need for replacing brake heads and beams.

Loose, worn keys not only cause brake head wear, but they also cause shattered brake shoes. The Lockey will eliminate this and pay for itself in reduced brake shoe breakage alone, within the first year!

Why? Because the Lockey is a *spring*—a specially designed spring, heat treated for long life and tremendous power. What's more, its installation is simple: a few raps of a hammer and it's there to stay. Remove with a few raps in the opposite direction and it can be used again.

A-447

Brake Shoe

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue, New York 36, N. Y.
In Canada: Dominion Brake Shoe Co., Ltd.

Now "Roller Freight" can save the railroads ~~$288,000,000~~ $224,000,000 a year

YOUR railroad can now save more money than ever by going "Roller Freight"—putting all freight cars on roller bearings. The chart below, based on a new 1958 study, shows that estimated savings in maintenance and operating costs will be $288,000,000 a year when all freight is "Roller Freight". That's 28% more savings than shown in 1955. It represents a return of about 24½% on the investment, or savings of $144 per car every year. "Roller Freight" is a big weapon to help you win the battle of rising costs.

While the cost of friction bearings and other things a railroad uses have gone steadily upward, the cost of Timken® roller bearings has come down and down. Today, the extra cost of equipping a freight car with Timken roller bearings is about half what it was 10 years ago.

Now an amazing new kind of production line at Columbus, Ohio is capable of narrowing the price gap still more between friction bearings and Timken roller bearings. Using ultra-modern machines, it mass-produces Timken bearings for freight cars only. And it's geared to produce 20,000 car-sets a year—hold your bearing costs to an absolute minimum.

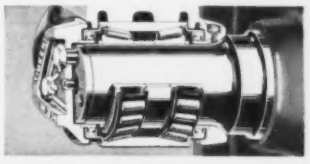
Your railroad can make the most of this new plant by getting together with the other railroads and ordering a specified number of Timken roller bearings every year. The result would be the kind of planned conversion that will keep your roller bearing costs at a minimum and help you establish more economical shop schedules.

Ask your maintenance and operating people what they think of "Roller Freight". One railroad's freight cars rolled over 300,000,000 car-miles with only one overheated bearing. On another line, Timken-bearing-equipped cars recently rolled 216,000 miles each without adding lubricant—the equivalent of over 12 years normal operation.

SAVINGS WHEN ALL FREIGHT IS "ROLLER FREIGHT"	1955	1958	ADDITIONAL SAVINGS
1. Savings from eliminating the hot box problem	$ 24,413,374.98	$ 45,502,194.42	$21,088,819.44
2. Savings in terminal bearing inspection time	164,699,060.22	191,692,293.75	26,993,233.53
3. Savings in lubricant	5,450,292.96	8,497,528.10	3,047,235.14
4. Savings in maintenance and replacement	15,718,042.49	24,902,006.29	9,183,963.80
5. Savings in periodic routine inspection	13,763,278.97	17,971,966.42	4,208,687.45
TOTAL SAVINGS	$224,044,049.62	$288,565,988.98	$64,521,939.36

SOURCES: *Timken Company Economic Study, statistics from AAR, ICC, University of Illinois and individual railroads.*

Start right now *planning* your "Roller Freight" modernization and new car program. Start switching to "Roller Freight" and take full advantage of your new roller bearing production line. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



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TRADE-MARK REG. U. S. PAT. OFF.

"Roller Freight" is the next great step in railroading